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A Magazine of Western Ornithology

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GEORGE WILLETT:

May 28, 1879–August 2, 1945

By HILDEGARDE HOWARD

George Willett was born in Hawkesbury, Prescott County, Ontario, Canada, the first child of George and Hannah Willett. His father, George Willett senior, was of English birth and Norman ancestry. Coming to Canada as a young man, the elder Willett attended university and theological school there and became an ordained minister of the Congregational Church. In Quebec Province he met and married Hannah Theodosia Hill, a school teacher, whose family, of English descent, had lived in Quebec for several generations.

While George, Jr., was still an infant, his parents made their home in Cowansville, Quebec Province, where George spent his early childhood and received his first schooling. It was there, also, that his two brothers, Fred and Harry, were born. In 1887, George, with his mother and brothers, went to stay on his grandmother's farm at Eaton Corner, about 50 miles east of Cowansville, while his father journeyed to Redlands, California. At Redlands the Reverend Willett became the first minister of the Congregational Church, and establishing a home for his family, he was joined there by his wife and the boys in April, 1888.

Of his boyhood in Canada, George Willett later recorded (autobiographical notes, MS):

"Cowansville was a small town on the bank of the Yamaska River, surrounded by farms and woodlands. My early memories are mainly of the river and woods, as even at this early date these features were of infinitely greater interest to me than residence and business districts. I am told that my penchant for leaving home, usually without permission, to wander in the woods or fish or swim in the river, was the cause of great anxiety to my parents on numerous occasions. However, as I learned to swim very early in life, and could always find my way out of the woods when ready to leave them, the only bad endings to my expeditions took place after I arrived safely at home and was duly escorted to the wood-shed.

"My interest in natural history certainly began in Cowansville . . . . In my first skinning attempt a frog was the victim, this unfortunate animal being skinned and nailed flat on the side of the house. One of my most cherished possessions at this time was the endblown egg of a screech owl which I acquired by barter from an older boy.

"Probably the experience which astonished me the most during my early attempts to study avian behavior was caused by an entirely unwarranted attack on my person by a 'partridge' (ruffed grouse) which I disturbed on her nest."

The absence of a nearby river at Eaton Corner was something of a disappointment to eight-year old George. "But," he says, "as much of the time spent there was winter, I was able to devote many of my out-of-school hours to learning to use snow-shoes and

skates. Here I also learned to chew tobacco, a habit that was indulged in by most—if not all—of the male inhabitants over six years old.

"At Eaton Corner I shot my first bird, a crow, with a bored-out, muzzle-loading Queen Anne musket which I had to rest on a fence as it was too heavy for me to hold otherwise. The shot was more effective than many that I have fired since, both game and hunter being casualties: the former dead, the latter stood on his head in a snow drift."

At Redlands, George attended grammar school until 1891 and then entered the Redlands high school. While still a pupil in grammar school, young George started his real study of birds. "About 1890," he writes, "a large proportion of school boys possessed collections of birds' eggs and it required no urging to persuade me that I should do likewise. Father had always been opposed to useless destruction of wild-life, so it was with some trepidation that I asked his permission to become an egg collector. After due consideration, Father informed me that I would be allowed to collect eggs under certain conditions. He would buy me a book on American birds, so that I could learn to know the different species and their habits; also, my collecting would be limited to one egg from a nest. I am sure that any ornithologist who started his studies about the same time I did could guess the identity of the book I received: 'Nests and Eggs of North American Birds,' by Oliver Davies, for many years the gospel of the egg collector." This interest in birds was shared by George's brothers, and some of the first eggs taken were recorded on printed forms headed "Oological Collection of Willett Bros."

"Transportation in those days was very different from now," he continues, "and though we boys might occasionally get a horse or burro to ride, most of our collecting trips were made on foot. It was a long hike to Yucaipa Valley where red-wings and occasional coots nested in a small tule swamp, and almost as far to the few cotton-woods in the wash of the Santa Ana River. The timber-covered San Bernardino Mts., although nearby now, were then beyond our possibilities. However, during my stay in Redlands, I did learn quite a lot about some of the birds, largely through careful study of Oliver Davies. It took me some time to discover that our 'Spanish Mockingbird' was the Phainopepla, and it was several years before I was sure whether our marsh blackbird was the red-wing or bicolored."

In 1893 the Willett family moved to San Luis Obispo. George found this area fascinating country for bird study, and his records refer to collecting trips at this time, along the coast and on the nearby small, rocky islands were sea birds were abundant. In the Upper Salinas Valley, he found Yellow-billed Magpies in abundance in 1894, and he caught his first view of the California Condor, which, in those days, nested occasionally within a few miles of town.

In the fall of 1894, the Willetts again returned to southern California, and George entered Whittier Academy (later Whittier College). He was a tall lad by this time, with considerable dignity. His charming personality and dry sense of humor made him very popular among his classmates.

It was in 1895, in Whittier, that George wrote his first published paper. He had been interested in Ravens since, in 1892, at the age of 13, he had first seen a pair near San Jacinto, California; and for the ensuing years he had tried to find an occupied nest. When, therefore, he learned of the presence of breeding ravens in the Puente Hills, near Whittier, and was able finally to collect several sets of eggs, it was an event worthy of published comment. This record is written in boyish fashion, revealing the exuberant interest of the youthful George, and is signed "Geo. Willett, jr., Whittier, Calif." He says (1895:110), "I made up my mind on the spot that if Raven's eggs were to be obtained

Fig. 5. George Willett at about 16 years of age, with his brothers, father, and maternal grandmother.

in the Puente Hills I would add some to my collection. One of the boys of Whittier [Clarence B. Linton] told me one day in February that he knew of a nest of these birds which he and his companions had tried in vain to reach the year before. I prevailed upon him to take me to the cliff it was in and there sure enough in a small cavity near the center of the cliff which was about sixty feet in height, could be seen the outer edge of a large nest of sticks."

Preparing to scale the cliff, a rope was attached to a tree above the nest. "At first," he continues, "I attempted to ascend from the bottom but this proved too difficult and I at last gave it up. I then went to the top and climbed down the rope until I could sit in the entrance of the cavity where the nest was. There to my great joy I perceived five handsome eggs reclining snugly in their bed of sheep's wool." He mentions that, "one egg was slightly jammed in the nest but was safely blown and the break would not be noticed,"—a refreshing contrast to the hypercritical viewpoint of the modern egg collector.

In the school vacation of 1895, George accepted the invitation of Nathan and Robert Moran, whose acquaintance he had made while living in San Luis Obispo, to return to that region for a visit. Of this he writes (autobiographical notes, MS): "By that time, roads had improved somewhat, so I was able to make the trip on my bicycle, carrying a blanket and sleeping in straw stacks en route. This collecting season was a notable one to me. I took my first set of duck hawks' eggs near Avila, and black oystercatchers' on the Pecho coast. But the highlight of the season was the collecting of the first set of eggs

of the white-throated swift known to science. The Morans had located a nest in a crevice in the roof of a cave on the ocean bluff near Avila. We cut a pole in a nearby eucalyptus grove and lowered it down the cliff to the cave. The pole was stood up in the cave and while the other boys held it, I climbed it and by baring my arm, was able to get the tips of my fingers over the edge of the nest and extract the five eggs one at a time and hand them down to the boys below."

In Whittier College, George's fine physique won for him a place on the football team when he was only sixteen. Football, as he later explained, was not then the game of endless substitutions that it is today. In the '90's the Whittier eleven (and *only* eleven) bicycled the 12 miles or more of dusty, bumpy roads to Los Angeles to play the opposing team, played the entire game, and pedaled back to Whittier again. No wonder George Willett had not too high opinion of the modern football hero!

In June, 1897, mother Willett, a frail and gentle woman whom George adored, passed away. Shortly after this George left college and home to secure his first job—on an orange ranch at East Highland, in San Bernardino County, where, he says, his work consisted largely of handling horses and mules. By this time he was nearly fully grown and capable of handling a man's work.

At East Highland, George joined the California National Guard, and when war with Spain was declared, in 1898, his regiment was sworn into United States service. Much to his disappointment, however, the group was kept in training at the Presidio at San Francisco for several months and then mustered out. George wasted no time in enlisting, then, as a private in the 35th U. S. Volunteer Infantry which was slated for service in the Philippines.

Although the war with Spain was over by the time his regiment reached Manila, it took active part in quelling the Aguinaldo insurrection which followed. George's diary for November, 1899, shows that he marched over a hundred miles in the first three weeks on the islands, traversing some of the same territory covered by MacArthur's men in 1944. At the Agno River, so easily crossed by the mechanized troops of today, his detachment was unable to follow the escaping Aguinaldo who had destroyed the last available boat, after effecting his own crossing. In response to a call from General Lawton for a volunteer to investigate the possibility of fording the river, George stripped and swam back and forth time after time only to have to report, as darkness descended, that crossing would be impossible except for good swimmers, unencumbered by fighting equipment. These sorry events took place on Thanksgiving day of 1899, and George's dinner consisted of a small handful of half-cooked rice, eaten on the bank of the river.

In February, 1901, while still in the Philippines, George received his honorable discharge from the army; he then served as an officer in the Manila Police Department for five months. Late this same year he left Manila and returned to the United States on an army transport, by way of Japan and China, making tantalizingly short stops at ports of call only.

George's collecting activities were considerably curtailed during his army service. He managed to take a few sets of eggs in the Philippines, but, unfortunately, these were all destroyed by rats before he could get them home.

Soon after his return to California, in 1902, George Willett, now grown to young manhood, accepted a position as recorder with the United States Geological Survey. This work took him to Arizona and Montana, where in his spare time he continued the collecting and study of wild life.

In June and July of 1903 he made several visits to Lake Bowdoin in northeastern

Fig. 6. Willett in 1901 while on Philippine police force.

Fig. 7. Willett shortly after joining the Los Angeles police force.

Montana. This lake, 3 miles in diameter, has in its center several small islands, on which Willett found numerous nesting birds. Reaching these islands was no small undertaking. After arriving at the lake by train, he found no boats available, so proceeded to wade to the nearest island. His own description (1907:105) of his visit to this island is too colorful to paraphrase: "I took off my clothes and carrying them above my head succeeded in wading to the first and largest island which was about 150 yards out. I was met half way by a swarm of Common Terns and Avocets. As I stepped ashore the ducks started to rise from and the grass all around me and I found myself in the midst of four or five acres of eggs. The bare spots between the grass patches were occupied by the Terns and Avocets, and I also found two nests of the Spotted Sandpiper, each containing four eggs." The next island being another three-quarters of a mile beyond, and the wind having stirred up the waters of the lake, George postponed his attempt to reach it until the following week. He then returned to the spot, armed with a wooden pickle bucket, "to bring back the spoils," and, as the water was quite calm, swam out to the island. He found the greater part of its two acres to be occupied by a rookery of hundreds of Great Blue Herons, with Ring-billed Gulls, White Pelicans and ducks in lesser numbers. After completely exploring the area, he loaded his bucket and made the return trip, swimming on his back with the egg-filled bucket poised precariously on his chest!

Late in 1903 Willett returned to southern California where he remained for the next nine years. Here he met and married Anna Wells, and became the father of one son, George, Jr. Settling in Los Angeles, he joined the police force of this city, advancing in

his years of service from patrolman to sergeant. One of the strongest men on the force, he entered into the sports contests of the police and upheld the championship for his group in the annual tug-of-war against the firemen, in which he acted as anchorman.

For many years he was assigned to old Chinatown and became well liked by the Chinese for his genial personality and fairness in dealing with them. They brought many of their disputes to him to settle, and they went so far as to make him an honorary member of the Hop Sing Tong. Undoubtedly his great size and resonant basso voice helped somewhat to engender their feeling of respect for him. Willett now stood 6 feet 3 inches in height and weighed in the neighborhood of 250 pounds. He knew all of the "old-timers" by name, and his discerning eye was quick to note new faces. In this way he had no trouble in rounding up groups of illegally imported Chinese.

It was about a year after his return to Los Angeles that George Willett discovered the Cooper Club and applied for membership. On the night of April 20, 1905, at the meeting of the Southern Division held in the offices of Mr. Howard Robertson, in downtown Los Angeles, Willett's application was presented. On this same evening "Mr. Loye Holmes Miller, State Normal School, Los Angeles," was elected to active membership. From this time in April, 1905, when he was welcomed to the club by President Eugene Law, until the meeting of June, 1945, the last scheduled meeting before his death, George Willett was in regular attendance at the Southern Division unless called elsewhere in line of duty. Some of his closest friendships were formed at those early Cooper Club gatherings. The group that met in those days in Los Angeles was small, usually 12 to 18. The names most frequently appearing in the minutes were Willett, Eugene Law, Harry Lelande, Joseph Grinnell, Alphonse and Antonin Jay, Joseph Dixon, H. F. Clifton, Howard Robertson, W. P. Taylor, G. F. Morcom, W. B. Judson, and Loye Miller. Willett's notes mention collecting trips taken with one or another of these men, singly, or in groups. Often, too, a friend from Cooper Club accompanied him on his Chinatown beat and enjoyed a tour which the average American would rarely be privileged to experience. Loye Miller tells of one interesting occasion when, in response to his query regarding the swifts' nests eaten by the Chinese, Willett conducted him to a small store, tucked away on a side street in the Chinese quarters. Here, after some friendly parley, Willett persuaded the proprietor to part with several broken bits of this rare and cherished delicacy.

From the time of joining the Cooper Club, Willett's scientific study of birds developed rapidly. In addition to egg collecting, he became interested in studying the habits of birds, and he also began his collection of bird skins. Presumably he had prepared skins even in his boyhood but had not previously endeavored to maintain a scientific collection. The first skin entered in his catalog is dated October 21, 1905, and by the end of that year he had listed over a hundred specimens. Always at home out of doors, watching birds in the wild since childhood, Willett now began to publish some of his observations. In May, 1906, two of his notes appeared in "From Field and Study" in the Condor, and the November issue of that year carried a short article on the nesting of the Clapper Rail at Nigger Slough in Los Angeles County. Longer papers began to appear the following year.

With his friends of the Cooper Club, Willett was in the field whenever his police work allowed. In the years 1907-1912, the Condor carried his reports on many trips taken in and near California, from San Luis Obispo to San Diego, and south into Lower California. Of these a few refer to inland areas, but his interest centered largely in birds of the ocean and shore. This interest in water birds served to stimulate others of the group to greater study of coastal birds and resulted in adding some thirty species to

those recorded for southern California by the time the new distributional list appeared in 1912.

The more extended trips taken in this period included two expeditions to the Santa Barbara Islands and one to the coast of Lower California. The earlier of the Channel Islands trips was made in November of 1907, in a "dilapidated fishing smack" with his old school friend, Clarence Linton, Linton's father, and a crawfisherman named "Cold-foot" Jorgenson. As described by the younger Linton (Condor, 10, 1908:124), this ten-day expedition was an exciting one. As is frequently true around the islands, the wind was strong, and the none too sturdy craft was twice saved from destruction on the rocks by the skill and quick-thinking of Willett and the Lintons. Once established in camp at Santa Cruz Island, however, they found the collecting good, and there was fine opportunity for observation.

Willett's second trip to the islands was taken in June, 1910, with several other Cooper Club members, and on a more seaworthy launch. Two days were spent on Anacapa Island where nesting birds were observed and eggs were collected. Touching at Santa Cruz and Santa Rosa Islands the party went on to San Miguel where it was stranded for 14 days due to storms.

Willett seemed destined to encounter inclement weather on these early expeditions. On the trip to northern Lower California, in April, 1912, taken in the company of W. J. McCloskey, for the Los Angeles Museum, H. C. Lowe, conchologist, and Clarence Linton, only two of the twenty-two days at sea were calm. In spite of the weather, however, Willett returned with a quantity of notes and a number of excellent specimens; another valuable experience was added.

In 1910 interest in the building of a museum for southern California was occupying the attention of the Cooper Club. The Club had been given the responsibility of planning the ornithological exhibit for the new museum and had been asked also to prepare data to be placed in the cornerstone. George Willett was appointed on committees concerned with the carrying out of both of these missions. Thus, his contact with the Los Angeles County Museum began seventeen years before he entered the employ of the County and became curator in charge of the Ornithology department of that institution.

Recognizing the accuracy with which he recorded his observations in the field, as well as the considerable knowledge of southern California birds by this time at his command, the Cooper Club, in 1910, assigned to George Willett the task of compiling a new distributional list of birds of the area to replace that prepared by Grinnell some ten years before. He accepted this task with characteristic modesty, indicating his willingness to undertake the work, but stating that he would need to call upon all other members for help in gathering the necessary records.

Preparation of this list occupied most of the spare minutes at his disposal for over a year. Loye Miller tells of visits to George when on duty in Chinatown. He had a little "office" in the old haymarket on the edge of the Chinese quarters. In here he had his telephone and a desk, and on a shelf in the desk was his notebook. This he would open to ask Miller what information he could fill in about this or that species. When the time came to start around on his beat again, Miller would accompany him, talking over observations of birds between sing-song greetings exchanged with the Chinese.

Early in 1912 the manuscript was completed, and on July 12 it appeared in print. This first major publication by George Willett drew exceedingy favorable comment for its accuracy in attention to detail and for the large amount of new data recorded. It is not unlikely that the excellence of this work had much to do with his election, the following year, to full membership in the American Ornithologists' Union.

In the summer of 1912 Willett procured a leave of absence from the police force to accept an assignment with the United States Biological Survey as Reservation Inspector. In the interests of the National Association of Audubon Societies he made a study of the bird life in the vicinity of Sitka and in particular of those birds on St. Lazaria Bird Reservation. His report on this first of his many trips to Alaska appeared in Bird-Lore in the latter part of the year.

In December of this year Willett, now resigned from the Los Angeles Police Department, joined an inspection party organized by the Biological Survey to visit several of

Fig. 8. First trip to Alaska, 1912.

the smaller Hawaiian Islands, giving particular attention to Laysan. This trip was a continuation of the Survey's inspection of these islands as a result of the mass destruction of bird life there by plumage hunters, in 1910. Previous observations had been carried on in the summer months, and this was the first winter census of the sea-bird population. The birds were found to be re-establishing themselves, and it was possible to bring back a number of scientific specimens. Alfred M. Bailey, who was also on this trip, relates, in a recent letter to me, one of the many adventures of the trip, in which George Willett was involved. He writes as follows:

"I recall one day I was on the north end of the island [Laysan] shooting sharks when I was surprised to see George come swimming in from the barrier reef. He had gone out there some two miles, killed a turtle, and then swam back with the bloody meat

Fig. 9. George Willett and Alfred M. Bailey skinning rare Hawaiian seal (first specimen to be preserved). Laysan Island, December 31, 1912.

on his back. He landed in a pot hole where there were sharks about 5-8 feet in length, and taking a knife for his security, went after them. He hit one in the head and his hand slipped over the hilt, cutting his fingers severely. When he climbed out over the coral reef, dressed only in his shoes, he held out his arm with the blood running from his elbow and remarked, 'Al, that's what I get for being a kid all my life.' "

This visit to the Hawaiian Islands probably marks Willett's first experience in collecting mollusks. He became interested in picking up beach shells on Laysan, and, on Oahu, joined a couple of conchologists in collecting land snails. His vigorous shaking of the trees, bringing down the tree snails in good quantities, was the source of considerable amusement to fellow members of the party. He was not concerned with making a mollusk collection of his own at this time and most of the specimens taken were disposed of to others.

Returning to California, Willett was appointed inspector for the Biological Survey for the western United States, under the new Federal Migratory Bird Law just going into effect. For the next five years his work with the Survey took him to Alaska in the summer and early fall, and to California, Arizona, and Nevada in the winter. Many new bird reservations had been created, and it was Willett's job to report upon the conditions in these areas and to enforce the "no shooting" laws. In the summer of 1913, as in 1912, he was located in the Sitka area of Alaska. The summers of the next four years, however, were spent at Forrester Island. His bird observations during this time appeared in the Auk and in the Condor for 1915 and 1917. While at Forrester Island he spent some time in dredging for marine mollusks and began to make a study of the species found. His first paper on this group was written for the Nautilus in 1918 and contained the description of a new species of bivalve.

The summer of 1918 was spent in Harney County, Oregon, at the reservation at Malheur Lake. Here Willett met Stanley Jewett, also working for the Biological Survey. Mr. Jewett tells, in a recent letter, of their first meeting, on a hot day in August: "Going to the hotel I was told the number of George's room, and as I knocked on the door a very heavy deep gruff voice said 'Come in.' I opened the door and there sat George at a little

table skinning two small bats that he had recently brought in. Having never seen George before, and finding him at the table, stripped to the waist, following his chosen work, I was greatly impressed, especially with the enormous size of the man and his broad shoulders and deep voice. Knowing George, as most of us do, you realize that it took very little time to become acquainted.

"A few days later we were joined by Dr. George W. Field, formerly in charge of wildlife refuges under the supervision of Dr. T. S. Palmer. The three of us not only visited Malheur Lake and vicinity but made a reconnaissance trip through the desert regions of south-central Oregon, visiting Catlow Valley, Lakeview, Summer and Silver lakes, and ended the trip at Klamath Falls, Oregon, early in September. Most of that section was new to George and I can remember the enthusiasm and delight he expressed in seeing the large numbers of California Jays in the Summer Lake Valley, and of Piñon Jays, Gray Jays and Crossbills in the lodgepole pine forests in Lake and Klamath counties.

"Spending the time together, camping in the desert and pine forest, eating out of the same frying pan, and drinking out of the same coffee pot, a close friendship was developed . . . ."

At the close of this expedition, Willett put his family affairs in order and entered the armed services in World War I. He was sent immediately to the Infantry Officers' training camp at Waco, Texas, where he was on November 11, when the Armistice was signed with Germany. A week later he was a civilian once more, and for about four months (until March, 1919) served as United States Game Warden for Los Angeles and vicinity. He then resigned from the government service and, a few months later, returned to Alaska on his own.

From his previous experience in Alaska, George Willett had concluded that a man could make a living there by trapping in the winter and fishing in the summer. This seemed an ideal arrangement which would give him plenty of time for scientific collecting as well. He therefore moved his family to Craig, on the west coast of Prince of Wales Island. He was probably the first active ornithologist to winter in southeastern Alaska. An account of the first winter and early spring (1919-1920) there appeared in the Murrelet (1921, vol. 2, no. 1). This is exceedingly interesting reading, telling of the resident birds present through the winter, the migrants noted, the first spring arrivals, and the nesting of various species. He mentions being joined at Craig by Sidney Peyton, and he comments on their journey to Forrester Island as follows (*op. cit.*:8): "On May 10th we packed our camp equipment on the writer's twenty-one foot power dory and proceeded to Waterfall, Prince of Wales Island. We remained there over night and on the morning of May 11th went out through Meare's Pass, between Dall and Suemez Islands, to the open sea and headed for Forrester Island, arriving safely shortly after noon in a pouring rain storm. . . . We were joined by the writer's family on June 1st, and on July 9th, A. M. Bailey of the U. S. Biological Survey landed on the island and remained with us until July 21st."

Mr. Bailey's recent letter takes up the story of his visit with Willett that summer, ". . . I joined him on Forrester for a couple of weeks. Sidney Peyton was on the island also, and we had a good time together. When I tried to get back to the mainland, my gas boat broke down, and I started for Japan without any sails. George picked me up and took me to Dall Island in his open dory. On the way in we collected a pair of half grown ancient murrelets, which George said were the only ones taken so far as he knew, after the young left the islands."

Navigating among these islands of southeastern Alaska was tricky business, and

Willett must have been an expert navigator to know how and when to ride the tides. Life here was rough, but undoubtedly the very hardships were a challenge to his spirit of adventure. Bailey tells of finding Willett on one of the off-shore islands where he had gone to trap. "I think he was rather glad to see me appear on the fisheries boat," writes

Fig. 10. George and Ora Willett on their wedding trip, in 1925.

Bailey, "for he had been marooned on the island by a couple of weeks bad weather and was down to his last pot of beans and was smoking coffee."

In the winter of 1920-21, bird life was scarce at Wrangell, Alaska, where Willett was located for the season's trapping. He therefore turned his attention to the scientific ob-

servation of the mammals at hand, and his first mammal publication (Murrelet, 1921, vol. 2, no. 2) is concerned with that winter's experiences.

In the spring of 1921, he abandoned the idea of trapping and fishing for a living and became Deputy United States Marshal, stationed first at Craig, and later at Ketchikan, Alaska. In the period from 1921 to 1925, while deputy marshal, Willett had little time for scientific writing and there was a lull in his published work. His observations continued wherever he went, and he was able to collect in his spare time, but his publications did not get really under way again until after he returned to the states in 1927.

In February, 1925, George Willett was married to Ora Alta Bellah, of Ketchikan, his former marriage having been dissolved a few years before. A little later in 1925, he resigned as deputy marshal and he and Mrs. Willett took over a fox farm on Grant Island. This venture proved unprofitable, however, due to unusually warm weather preventing priming of furs, and Willett accepted an assignment from the Alaska Game Commission to make a trip to the Aleutian Islands. This trip, as well as his other years of experience in Alaskan areas, enabled him to be of assistance to the United States Army in World War II in the matter of determining available nonpoisonous fish, mollusks, etc., which could be used as food, in case of necessity, by men stationed in the Aleutians during the war.

With the conclusion of this expedition, in December, 1926, the Willetts decided to leave Alaska and make their home in the states. George loved Alaska, however, and for many years spoke of returning there to live when he had reached retirement age.

In February, 1927, at the age of 47, George Willett came to the Los Angeles County Museum, acting as Assistant Ornithologist under Mr. L. E. Wyman. Upon Wyman's death, early in 1928, he became the head of the department of Ornithology and Mammalogy and served in this capacity until his death.

His arrival at the Los Angeles Museum coincided with its acquisition of the William Alanson Bryan collection of marine, fresh water and land shells, numbering some 40,000 specimens. In view of Willett's experience in the study of Mollusca while in Alaska, one of his first duties at the museum was to assist in the sorting and cataloging of the Bryan collection. This work gave him the opportunity of continuing his study of Pacific Coast mollusks in addition to his ornithological work at the museum.

In mollusks, George Willett found a group requiring detailed research, where new forms were still to be encountered and described. North American ornithology had reached the saturation point as far as new species to be discovered, and the prevailing interest had centered in splitting into subspecies, a concern for which Willett had little interest or sympathy. The study of mollusks, therefore, as a field still to be explored, held great attraction for him and formed the basis of a large part of his later published work. Surprisingly for a man of his size, he had particular ability in the handling of small objects and in the observation of minute structure. Bearing witness to this there are 41 species and 8 subspecies of gastropods, pelecypods and chitons which carry his name as describer, with 5 others which he left described in manuscript.

One of the extended field problems which Willett undertook in southern California was determining the distribution of land snails in the deserts. Realizing that collection of these gastropods had been spotty and that exact data were lacking as to their distribution, he spent many week ends in making a careful survey of the desert regions. This work required tremendous patience and untiring search, and it is little wonder that no one previously had given it the attention necessary to a complete understanding of the problem. The enormity of the task may be appreciated from his description of a week end in the ranges bordering Coachella Valley and the Salton Sink (Bull. So.

Calif. Acad. Sci., 1939:14): "On our latest week-end trip 450 miles were traveled by auto, three mountain sides were climbed, and at least ten hours occupied in moving rocks, with a total bag of one living snail . . . and half a dozen dead ones good enough to bring in." The results of this survey, which stretched over a period of about ten years, were the addition of some fifteen species and subspecies to the list of known desert snails and the determination of distribution and relationships of many other species and races described by previous workers.

Shortly after coming to the Los Angeles Museum, Willett was instrumental in purchasing a small motorboat for the institution. On this he spent many week ends off the coast of southern California, collecting birds and dredging for marine mollusks. These trips were taken mainly in the spring and fall months when sea birds were in migration, and the observations made and specimens taken supplied many of the records included in his 1933 revised distributional list of the birds of southwestern California. His most frequent companion on these off-shore expeditions, as well as on all other field excursions, was his wife. An excellent sailor, and experienced camper, Ora Willett was capable of carrying her share of the work on ship or in camp. Mr. Willett never thoroughly enjoyed an expedition unless Mrs. Willett was present. He was also justly proud of her ability as "camp cook." "Sure she's a good cook!" he often said, "I taught her." Though a man somewhat conservative in his views of women, he modified the saying of "woman's place is in the home," to "a woman's place is with her husband," an ideal which Ora Willett ably fulfilled, were it stalking grouse by day, setting mammal traps by night, searching for snails under rocks in the desert, or working over manuscripts at home. The stimulus of her interest and companionship undoubtedly played a large part in the high scientific productivity of this later period of Willett's life.

Among the new friends which George Willett made after his return from Alaska, perhaps the closest was the late Herbert McCoy. Though a chemist by profession, Dr.

Fig. 11. The two Georges, Cantwell and Willett, at Mount Pinos, May, 1937.

McCoy had a great interest in birds, and the McCoys and the Willetts made frequent trips together. During depression days, when the museum was forced to stagger the time of its employees in order to keep running, Dr. McCoy proposed a trip for the two families to Guatemala. This trip, taken in the winter of 1932, was a combined pleasure and collecting expedition which resulted in the addition of over 300 bird specimens to the museum's collections.

In 1929 Mr. Willett called in George Cantwell, an old-time Alaska man, whose path he had been crossing off and on since the two of them took their first examination for inspector with the Biological Survey on the same day in 1912. Although, in the intervening 17 years, Willett had never become well acquainted with Cantwell, the latter's reputation as a collector and expert in mammal taxidermy had spread, and the museum was now in a position to take on an assistant to Mr. Willett. In April, 1929, therefore, Cantwell joined the staff, and the two Georges became fast friends.

It was about this time that I moved into a room across the hall from the ornithology-mammalogy offices, and the Georges took an interest in helping me accumulate much needed bird skeletons. If a wing or leg bone of some rare species was essential to the solving of one of my paleontological problems, Willett generously offered one of his own study skin specimens for the skillful operation Cantwell could so ably perform, and the bone was mine, the skin no worse for the deed. Mr. Willett also began to collect extra birds and mammals especially to be used for skeletons, adding over 300 specimens to the osteological collection. Many of these he took off-shore, while out in the museum boat, or collected on his desert expeditions. Furthermore, he took pains to save the body skeletons from specimens which he was preparing for study skins.

Though Mr. Willett sometimes enjoyed teasing me about establishing records of species from "nothing but bones," no osteologist could ask for better cooperation than I received from his department. I felt that I, and the bones, had really won his respect when he posed the problem of distinguishing between the young of the Parasitic and Long-tailed jaegers on the basis of their skeletons. The results of this study, Mr. Willett and I published in joint authorship, though, with his characteristic generosity, he insisted that he "hadn't done anything" on the paper, and wanted me to take full credit.

Although George Willett never studied fossil birds himself, he was much interested in the work that was being done and often his knowledge of the habits and distribution of living birds was a contributing factor in the decisions reached in my studies of the Rancho La Brea avifauna. His own entry into the field of paleontology came through his work on marine shells. Many of the shell students of Los Angeles frequently came to him for identification of specimens which they had dredged or picked up on the beaches, and some began bringing in fossil shells. As the most accessible of the marine fossil deposits of this area are of Pleistocene age, and therefore contain mollusks similar to those still living, Willett's interest was aroused. In 1935 a new fossil site was discovered in Playa del Rey, by some of the shell enthusiasts, and samples reached his desk. Examination of this material convinced him of the importance of the site. Consequently he went to work with shovel and screens, and in the course of two or three months intermittent digging he had provided the museum with a representative collection from the area totalling 30,000 specimens. Most of these were shells, which became the subject of a paper, published in 1937, presenting the results of his careful sorting and study of thousands of specimens.

Before completing the work on the del Rey material, however, the Willetts had the opportunity to make the long anticipated return visit to Alaska. In the company of the McCoys, they spent the summer of 1936 in the vicinity of Petersburg, collecting

various zoological specimens for the museum, including, in addition to about 100 birds, nearly 200 fishes, 2000 marine invertebrates, a few mammals, amphibians and insects.

Returning to Los Angeles, the remainder of 1936 and part of 1937 were occupied in work with fossils. The del Rey paper was completed, but even before it appeared in print, Willett had excavated two more marine fossil deposits, studied the contents and published the results of his work.

Fig. 12. Willett and Grinnell at the Museum of Vertebrate Zoology, Cooper Club Annual Meeting, 1937.

In addition to these fossil investigations, he completed, in 1937, a comprehensive study of the land snails of southeastern San Diego County, described another species of gastropod from the Riverside Mountains and a chiton from Lower California, and wrote several notes on bird observations and one on mammals. The work of this one year typifies the breadth of George Willett's horizon of investigation during this later period of his life. His specializations took him to opposite ends of the animal kingdom and into two horizons of time, yet there is no doubt but that he held a chair of authority in each realm. There were no half-way measures in his approach to a subject. If it was worth study at all, it was investigated thoroughly. This quality of conscientiousness, combined with a certain conservatism, won for his work the unqualified respect of his colleagues in science.

Late in 1937, Mr. J. R. Pemberton proposed a voyage on his yacht, the "Kinkajou," to the islands off the coast of Mexico. George Willett was invited to "come aboard" as ornithologist and malacologist of the expedition. Unlike some of the trips mentioned in Willett's earlier life, this one was favored by good weather throughout. In the three months trip, from January through March, 1938, birds were collected at Magdalena Bay, Isabel Island, Cleopha Island, several localities in Jalisco and Oaxaca, San Benedicto Island, Socorro Island, and the San Benitos. Between landings, Willett and Steve Glassell, dressed only in shorts and hat, carried on dredging operations which netted a good collection of crabs, mollusks, and other types of marine invertebrates.

The year 1939 opened with the museum's launching a program of biological survey of the Channel Islands. In view of Willett's previous experience on the islands, he was called upon to help in planning the project, and he accompanied Dr. John A. Comstock, Associate Director of Science, on the first reconnaissance trip to San Clemente. For the next two years, the museum made numerous expeditions to the islands, the last of which ended abruptly with the beginning of the war. On these trips, Willett collected birds and mammals and made careful surveys of the birds of the islands. In addition to his own field work, he frequently spent a couple of hours in the evening capturing

Fig. 13. Aboard the "Kinkajou," January, 1938.

moths on the screen of his tent; thus hundreds of specimens were brought back for the entomology department. Mrs. Willett officiated on many of the trips as chief cook, frequently being the only woman in the party, with several hungry men to cook for.

America's entry into the war inevitably brought changes to the museum. The younger men were going into military service, and among them was Kenneth Stager, who by this time had replaced George Cantwell as assistant to Mr. Willett. Willett, himself, felt keenly the fact that not only was he too old to join the armed forces, but that an accident to his back a few months previous made it impossible for him even to volunteer to "walk a beat" as a volunteer auxiliary policeman. This injury, as well as the curtailing of gasoline, also cut out practically all field work. He therefore, found himself, for the first time in his life, largely confined to office life. The museum personnel now threw its efforts into publications which would appeal to the visiting public. This was a new venture for most of the scientists on the staff, and Willett was no exception. However, with characteristic immediate attention to duty to be performed, he wasted no time in preparing his part of this program. Within the next two years, four museum handbooks bearing his name appeared, three on Los Angeles County birds, and one on mammals. A fourth one, on birds of the deserts, was completed in

Fig. 14. Willett in his office at the Los Angeles County Museum, January, 1939.

manuscript and awaits illustration now. He also outlined a possible handbook on shells, but the tremendous number of species to be covered raised a problem regarding the size of the publication which had not met solution at the time of his death. He prepared, as well, a short story on the California Condor, which was planned for a popular leaflet. Early in 1945 plans were made for the museum's issuance of short technical works. George Willett again answered the call for papers with several manuscripts which now await publication.

During this period Mr. Willett worried considerably about the Southern Division of the Cooper Club. With those members not in the armed forces scattered widely throughout the Los Angeles area, the meetings dwindled to a small attendance. Since his return to southern California, in 1927, Willett had served the club faithfully, not only in many official capacities, but unofficially as well. In this critical war period he redoubled his efforts in the club's behalf, aiding the president in finding programs, attending every meeting himself, and helping out with transportation for others. There is no doubt that he held the group together through those trying days.

As the rounding out of a full life, Mr. Willett, at the age of 65, became a teacher. In the spring of 1944, the Director of the Museum, Mr. Roland J. McKinney, launched a program of natural history classes for high school students. Five subjects were sched-

Fig. 15. George Willett on his sixtieth birthday, May 28, 1939, sharing his birthday cake. Annual outing of Southern Division of Cooper Ornithological Club.

uled for Saturday mornings, and it was supposed that about 100 students would enroll and be divided among these. Mr. Willett and I, together, were to give the class in birds and mammals. On the day of registration, we found ourselves besieged by some fifty youngsters who insisted they wished to join our class, and we were unable to reduce the number below forty. The problem arose of procuring specimens on which this large group could practice taxidermy and skeleton making. For days the Willetts diligently trapped English Sparrows preparatory to the first lesson, while the Fish and Wildlife Service came to our aid with larger birds to skeletonize.

The experience with these young people would make a story in itself. They were full of life, and George Willett's deep voice occasionally had to remind them of the proprieties of the classroom. But they were tremendously interested, and they were completely charmed with Mr. Willett. Class was supposed to end at noon, but it soon became obvious that many of the students expected to spend the day. A typical Saturday afternoon sight in the ornithology office was Mr. Willett leaning back in his chair discussing trapping and taxidermy, or recounting some of his own early experiences to a group of ten or a dozen boys and girls. Moreover, he gave them the freedom of his laboratory, and they never abused the privilege. They brought in mammals to skin, they borrowed

his tools, they studied his books, and they asked his advice. In his last days at the museum he was helping a group of boys plan a mammal survey of one of the canyons. Even in the month's illness at home, "the kids" came to see him and wrote to him for counsel while on their vacations in the field.

From among these youngsters, his newest in a long line of friends, came the words which express the feeling of everyone who knew him, "George Willett was a distinguished scientist, a superb teacher, and a great guy! We'll miss him terribly!"

GEORGE WILLETT'S ORGANIZATIONAL AFFILIATIONS

Cooper Ornithological Club, Member from 1905; Honorary Member from 1942; President Southern Division, 1930; President Board of Governors, 1936-1937; Secretary Board of Directors from 1935.

American Ornithologists' Union, Associate, 1912; Member from 1913; Fellow from 1939; Vice-president from 1939.

Pacific Northwest Bird and Mammal Club, Member from 1920.

Conchological Club of Southern California, Member from 1916; President, 1929-1931, and from 1944. Served on all of the Club's committees.

California Academy of Sciences, Member from 1930.

Biological Society of Washington, Member from 1918.

American Society of Mammalogists, Member from 1935.

Southern California Academy of Sciences, Member from 1940; Chairman Conservation Committee, 1945.

San Diego Society of Natural History, Member from 1937; Non-resident Fellow from 1943.

Grinnell Naturalists Society, Member from 1940.

Los Angeles Audubon Society, Honorary Member from 1942.

Society of Vertebrate Paleontology, Charter Member from 1941.

Isaac Walton League.

Western Bird Banding Association, Associate Member from 1943.

U. S. Spanish War Veterans, Theodore Roosevelt Camp No. 9, Charter Member from 1905.

B. P. O. Elks, Ketchikan Lodge, No. 1429, Member from 1923.

Alumni Association, Whittier College.

Los Angeles County Employees' Association, Member from 1928.

Editorial Committee, Los Angeles County Museum, Member from 1943.

Advisory Council, Los Angeles County Museum, Member from 1944.

ANIMALS NAMED FOR GEORGE WILLETT

Birds:

Sula willetti Miller (1925)
Spizaëtus willetti Howard (1935)
Oceanodroma leucorhoa willetti van Rossem (1942)

Insect (Moth):

Carolella willettana Comstock (1939)

Mollusks:

Astarte willetti Dall (1917)
Ischnochiton willetti Berry (1917)
Odostomia willetti Bartsch (1917)
Scaphander willetti Dall (1919)
Clathrodrillia willetti Dall (1919)
Helminthoglypta traski willetti (Berry) (1920)
Cerithiopsis willetti Bartsch (1921)
Epitonium willetti Strong and Hertlein (1937)
Rissoina willetti Strong (1938)

Mammal:

Sorex willetti von Bloeker (1941)

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1911

15. Blue-winged Teal in Southern California. Condor, XIII, March, 1911:76.
16. May Notes from San Jacinto Lake [A. Jay and G. Willett]. Condor, XIII, September, 1911: 156-160, figs. 43-45.

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1913

20. Bird Notes from the Coast of Northern Lower California. Condor, XV, January, 1913:19-24.
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1914

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Los Angeles Museum, Exposition Park, Los Angeles, February 25, 1946.

NESTING OF THE BAND-TAILED PIGEON IN COLORADO

By JOHNSON A. NEFF and R. J. NIEDRACH

The literature on Colorado birds contains relatively few references to the Band-tailed Pigeon (*Columba fasciata*), although in recent years a considerable mass of information on distribution and economic status has been accumulated by bird students and game managers. Until the present time, however, data on the life history of the species in Colorado have been almost totally lacking. Adults were known to be present throughout the summer, and juveniles not long out of the nest had been seen at several points. There were reports of Band-tailed Pigeon nests but none substantiated by specimens or photographs; where or when nesting occurred was not known.

Niedrach had collected an adult near Kittredge on June 20, 1928, that contained a fully formed egg. On September 11, 1938, in Jarre Canyon, near Sedalia, he took several specimens whose crops contained a heavy residue of "pigeon milk" cells (examined by Neff). None of the specimens collected by Game Management Agent Frank Poley and state game wardens during the "cherry damage" season (late June to about July 20), over a period of years, contained either pigeon milk cells or well-developed eggs, although Poley found milk cells in the crops of a number of pigeons he examined during the shooting season of 1944, between September 16 and 20. From these and other field observations in 1944, it appeared that late July and August was the most probable period of nesting in Colorado.

There remained the selection of the most favorable place for hunting nests. West of Sedalia and extending southward from the South Platte River canyon to Woodland Park, the Rampart Range rises to a height of 9,340 feet. It is a rugged range, cut by numerous deep stream drainages, and it is well-forested with the scrub oak and other shrubs in the foothills; higher, there are yellow pine, spruce, and Douglas fir zones, with a moderate expanse of lodgepole pine on the summit. A good road follows the ridge closely for its entire length.

Fringing the eastern edge of the range, at approximately 6,000 feet, are foothill farms whose grainfields have long been known as the feeding grounds of Band-tailed Pigeons between June and September. (Less than 10 miles away, near Castle Rock, Colorado, in this same rolling foothill farming area, the Band-tailed Pigeon was first discovered by Long's expedition to the Rocky Mountains and described by Say in 1823.) About June 20, 1944, a band of approximately 200 pigeons appeared on a ranch in this area and remained apparently intact until July 4, when it began to decrease gradually in numbers. Although Neff spent a number of days searching the steep front slope of the mountain and following pairs or single birds on their flight from the feeding ground, no nests were found that year.

In 1945, the pigeons were late in appearing in the area; by July 4 only a few had been seen on the feeding ground. Other assignments prevented further field work in the area until after mid-August. Then, on the assumption that the earlier search had been made at too low elevations, Neff began to work downward from the summit road. There, on the summit of the Rampart Range, on August 22, 1945, he discovered the first Band-tail nest reported for Colorado. The nest was in a lodgepole pine at an elevation of 8,400 feet and contained a squab not over one day old.

Niedrach visited the location on August 23 to begin the photographic history of the nest, and both authors, separately and together at various times, searched the adjacent

ridges. Six unused or deserted nests were found within a two-mile radius, and on August 31 Niedrach found a nest containing a squab about 20 days old just a mile from the original nest. Both young were banded and subsequently left the nest. To avoid disturbing the birds and thus to assure a full photographic recording of the nests, it was decided to forego a regular recording of weights and measurements, but such data were obtained from time to time when the brooding bird left the nest of its own volition or when the young bird was photographed.

Both nests were carefully studied. The squab of known age was under observation for 25 days. The other squab, feathered when found, was thought to be 20 days of age on the basis of close comparison of all details of parental care, feather development and growth, weights, measurements, and development of physical activity.

Nests.—One nest was placed at the base of two large branches, against the trunk of the tree; all others were one to three feet out on flat branches. All were 14 to 16 feet above the ground, and their structure was typical of the pigeon family. All were in

Fig. 16. Male Band-tailed Pigeon brooding a ten-day old squab, August 31, 1945, Rampart Range, Pike National Forest, Colorado. Photo by R. J. Niedrach.

similar locations, either in a tree on the rim of some declivity or in a tree that stood taller than its neighbors downhill. The adults as they left the nest always took off in a steep downward dive to gain momentum before circling up and over the ridge.

Brooding.—Like other members of the pigeon family, the parents took regular shifts in the care of the young. The female was on the nest when it was discovered at 3:00 p.m. on the second day of the squab's life; the male brooded from 9:15 a.m. to 4:20 p.m. on the third day, but the female was on the nest all of the fourth day. After that the

exchange was regular. The male returned to the nest between 8:45 and 9:30 a.m. and brooded the squab until late afternoon. The female was more erratic and returned any time between 3:45 and 5:15 p.m. On occasions when she was unusually late, the male usually greeted her with gutteral exclamations.

The parents brooded the nestling for 20 days, leaving the nest only rarely for a few minutes (never more than 30) to chase off an intruder or to get a drink from a near-by spring. After the 20th day, each adult came once daily to the nest, between 10:00 and 11:00 a.m., fed the squab, and departed; they no longer brooded the young, even at night.

Feeding.—Although the nest was watched from daylight to dark, the female was never seen to feed the squab until after the twentieth day; she did not do so even on the fourth day when she was not relieved by the male. The male, however, fed the squab regularly. During the first week, three feedings daily were observed, between noon and 3:00 p.m. During the second week the schedule was reduced to two feedings; these occurred between noon and 1:30 p.m.

Growth of the young.—At one day of age the squab was barely two inches long, and it was unable to hold its head erect for more than seconds at a time. It was covered with a fine cottony down of a rather odd shade of yellow. During the first 10 days its body size increased visibly, but its gain in strength and its feather development were slow.

At 17 days of age the body feathers were 15 mm. out of the sheaths. The head was dotted with pin-feathers and there were large bare patches on the sides. The first primary was 30 mm. out of the sheath, and the central tail feathers were 28 mm. long. The fine yellowish down still adhered to the tips of the feathers, giving the squab an odd fuzzy appearance. Even at this age the squab snapped its bill at an intruding hand and crawled about on the nest. It weighed 140 grams.

On the 20th day the central tail feathers were 42 mm. long, and the first primary was 40 mm. out of the sheath. The pin-feathers on the head were opening, but the sides were still bare. At 23 days of age the squab began to look much like its parents except for the short tail; at this age the squab snapped its bill vigorously, slapped with bent wing at an intruding hand, and danced awkwardly about the nest.

On the 26th day the central tail feathers measured 75 mm., and the body weight was 243 grams. The squab spent much of the day picking off the fuzzy down that still adhered to its feathers, preening and rearranging the feathers time after time. On this day, also, the squab began to exercise for the first time, walking about, going as far as two or three feet out on the nest limb, waving and flapping its wings vigorously, craning its neck, and peering about interestedly. This activity increased on the following day. Observations were not made on the 28th and 29th days, but at dawn on the 30th day the squab was gone from the nest and from the tree. The squab in the other nest was last seen late on September 15, when it was 25 days old; it was sitting quietly in the nest and had not yet begun preening or exercising.

It is presumed that both squabs joined the flocks which fed in the foothill fields. Little is known of the activity of the juvenile Band-tail after it leaves the nest. Frequently the feeding area is far from the nesting location. It seems likely that loss of weight after leaving the nest may be entirely normal as the young bird begins to fly with the flocks and feed itself. Juvenile pigeons weighing as little as 205 grams have been collected from feeding flocks.

United States Fish and Wildlife Service and Colorado Museum of Natural History, Denver, Colorado, January 11, 1946.

ENDEMIC BIRDS OF THE LITTLE SAN BERNARDINO MOUNTAINS, CALIFORNIA

By ALDEN H. MILLER

The Little San Bernardino Mountains which bound the Coachella Valley of California to the northeastward attain heights of somewhat over 5000 feet. Barren in aspect on their southern face, they nonetheless support along their crests and on their northern slopes large tracts of piñon-juniper woodland and open chaparral growth of scrub oak, mountain mahogany, and manzanita. These plant associations mark an Upper Sonoran belt which extends 40 miles southeastward from Morongo Pass. A small area of woodland and chaparral occurs still farther eastward on Eagle Mountain, separated by a gap of at least 20 miles from the area in the Little San Bernardino Mountains. Northwardly the woodland occurs scatteringly over a plateau, which is the heart of the Joshua Tree National Monument, to the mountains immediately south and west of Twentynine Palms, San Bernardino County.

The Upper Sonoran area lies between the Colorado and Mohave deserts and adjoins similar areas of coastal southern California only to the westward where, at the eastern flank of the great San Bernardino Mountain mass, there is a narrow connection across Morongo Pass with the chaparral and woodlands of western Riverside and San Bernardino counties.

This peninsula of the Upper Sonoran Zone, seemingly because of its constricted base, its length, and the arid, open aspect of its plant growth influenced by desert climate and surrounding desert lowlands, has developed and conserved in partial isolation distinctive races of some permanently resident types of birds. Their degree of distinctness is surprisingly great in view of the imperfect westward barrier to the transfer of individuals between coastal populations and those of the Little San Bernardino Mountains.

Three endemic forms, a Mountain Quail, a Plain Titmouse, and a Bush-tit, are herewith described. Further details of their ranges will doubtless be forthcoming as additional biological exploration in the area is conducted. I am indebted to the National Park Service, and particularly to Mr. James Cole, Custodian of Joshua Tree National Monument, for the opportunity to investigate the vertebrate fauna of the Monument area which embraces the ranges of these new subspecies.

Oreortyx picta russelli, new subspecies

Type.—First-year male, no. 94166 Mus. Vert. Zool., taken near Pinyon Wells [2 miles southwest, 4300 feet], Little San Bernardino Mountains, Riverside County, California, October 17, 1945, by Ward C. Russell; weight 227.5 gm.; orig. no. 9662.

Diagnosis.—Similar to *Oreortyx picta eremophila* but dorsal coloration posterior to upper back much less brown and less richly olive, the mid-back and adjoining wing surfaces Grayish Olive rather than Deep Olive, the rump, upper tail coverts, and rectrices even grayer, Deep Olive Gray to Dark Olive Gray. Gray of breast and head similar, though averaging slightly paler on the forehead; consequently these parts conspicuously lighter than in *confinis* of Lower California.

Range.—Resident of chaparral and piñon-juniper woodland of Little San Bernardino Mountains, from vicinity of Morongo Valley eastward; also mountains near Twentynine Palms and Eagle Mountain; all in Riverside and San Bernardino counties, California.

Specimens of *russelli* have been examined from the following localities: Black Rock Spring, 18 mi. NE Whitewater Station, 3000 feet, in San Bernardino County (1); Quail Spring, 3600 feet, San Bernardino County (1); 6 mi. W, 3 mi. S Twentynine Palms, 3200 feet, San Bernardino County (1); vicinity of Pinyon Wells, 4000-4300 feet, Riverside County (13); Eagle Mountain, 3500-4900 feet, Riverside County (3).

Van Rossem (Condor, 39, 1937:20-24) in his review of the races of *Oreortyx picta* reported that *eremophila* was the palest dorsally of the subspecies then known and that it and *confinis* were the grayist or least brown. On the belly and flanks the southern races are darker than *picta* and *palmeri*. No important differences in measurements have been revealed. It is now apparent that *russelli* shows the extreme of reduction of brown and olive dorsally in the species and is the palest gray on the anterior parts of the body. Geographically it is a terminal member of the group of races in a southeastward direction and it is quite as sharply differentiated as is *confinis* of Lower California. One may wonder whether it is a relict of a once more wide-ranging form of the southern interior which developed grayness and pallor in the mountains of Arizona and New Mexico. Probably not more than 2000 years ago Mountain Quail occurred in New Mexico where their bones have been taken in cave deposits (Wetmore, Condor, 34, 1932:141; Howard and Miller, Condor, 35, 1933:16).

Eremophila in typical form extends east through the San Bernardino Mountains (critical specimens from Bluff Lake, Foresee Creek, Fish Creek, and Cactus Flat). Just east of Morongo Pass *russelli* has been taken (Black Rock Spring).

The new race is named in appreciation of Ward C. Russell, skilled and veteran collector of birds and mammals.

Parus inornatus mohavensis, new subspecies

Type.—Adult male, no. 94208 Mus. Vert. Zool., taken at Pinyon Wells, 4000 feet, Little San Bernardino Mountains, Riverside County, California, October 12, 1945, by Alden H. Miller; weight 15.6 gm.; orig. no. 5581.

Diagnosis.—Back and crown less olivaceous and brownish than in nearby coastal races of *Parus inornatus* of Upper California; near Hair Brown and Deep Grayish Olive instead of Deep Olive or Olive Brown of *P. i. transpositus*; much darker and browner gray than in *P. i. ridgwayi* to eastward. Under parts whiter than in *transpositus*, the drab and drab-gray of flanks and under tail coverts reduced in extent and intensity, becoming Smoke Gray. Wing and tail lengths not significantly different from those of *transpositus, murinus* of Lower California, and *ridgwayi* of Providence Mountains. Bill longer, in average, than in coastal races but not as long as in the gray titmice, *ridgwayi* and *zaleptus*.

Range.—Resident of piñon-juniper-scrub oak association of Little San Bernardino Mountains, San Bernardino and Riverside counties, California. Extends from Morongo Valley eastward to vicinity of Little San Bernardino Mountain, north of Mecca. Not found on Eagle Mountain to eastward.

Specimens of *mohavensis* have been examined from the following localities: Quail Spring, 3600-4500 feet, San Bernardino County (5); Pinyon Wells, 4000-4300 feet, Riverside County (12).

This race displays a grayness which exceeds that of *murinus* of northern Lower California. Among the coastal races of the species, only *cineraceus* of the Cape district equals *mohavensis* in reduction of brown dorsally. *Cineraceus* is, however, paler gray and its wing and bill are shorter. *Kernensis* is browner dorsally than *mohavensis*, although it is fully as pale ventrally. Both *murinus* and *kernensis* are well isolated from *mohavensis* by the intervening *transpositus* which is still browner.

Although it is thought that *mohavensis* has developed as a gray-backed type in an arid area through modification of a coastal brown-backed titmouse, the loss of brown and the increase in average size of the bill suggest intergradation with the gray titmice of the interior. The geographic range is such as also to point to this possibility. There is, however, a gap of about fifty miles of unsuitable desert terrain between the ranges of *mohavensis* and *ridgwayi*, a formidable barrier for a strictly resident species. On the other hand, there must be continuity with *transpositus* in the juniper belt in the vicinity of Morongo Valley along the east flank of the San Bernardino Mountains. *Mohavensis* in its total of color characters is distinctly closer to the coastal complex of races than to *ridgwayi*. It is problematical, therefore, whether the characteristics of *mohavensis* have

been derived in any part through occasional interbreeding of a coastally derived population with vagrants of *ridgwayi*, which rarely might have moved southwestward across the desert. *Mohavensis* shows no exceptionally great amplitude of individual variation such as often occurs in areas of secondary intergradation.

There are statistically significant differences in mean of bill length among *transpositus, mohavensis* and *ridgwayi* (see fig. 17). However, the extremes for *mohavensis* and *transpositus* are essentially the same. We may suppose that the same kinds of genes for size of bill are present in the two populations but that there is a different frequency of their occurrence. Possibly there has been a selective influence associated with the piñon habitat which has worked on the gene types present in an original *transpositus*

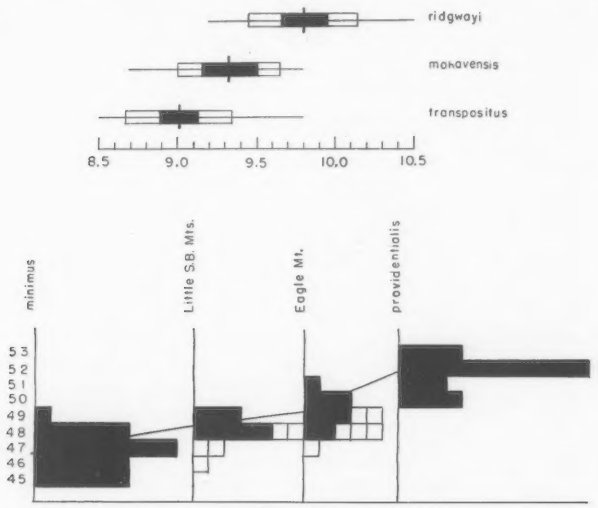

Fig. 17. Upper, graph representing lengths (mm.) of bill from nostril in races of *Parus inornatus*. Extreme limits of variation shown by lengths of horizontal lines; means marked by vertical lines; rectangles represent standard deviation; dark parts of rectangles, twice the standard error of the mean. Where dark areas do not overlap, the differences in mean are statistically significant.

Lower, frequency distribution of wing length (mm.) in races and populations of *Psaltriparus minimus*. Solid squares, males; open squares, females; line connects averages of males.

stock to establish the frequency characteristic of *mohavensis*. Thus there has been a modification in the direction of *ridgwayi*, which race evidently evolved in a similar floral environment, but this modification seems to have occurred without introduction of any of the genes for extremely large bill found in *ridgwayi* and without complete loss of the determiners for very small bill size that are present in *transpositus*.

In regard to color, the situation is different. No individual of *mohavensis* is identical with any member of *ridgwayi* or of *transpositus*, recently collected examples of which have been compared.

Measurements in millimeters of males

	Wing			Tail			Bill length from nostril		
	No.	Mean	σ	No.	Mean	σ	No.	Mean	σ
P. i. transpositus	26	70.78±.28	1.42	24	59.46±.36	1.76	30	9.01±.06	0.34
P. i. mohavensis	11	70.91±.34	1.12	10	60.20±.62	1.99	12	9.31±.09	0.31
P. i. ridgwayi from Providence Mts.	28	70.75±.29	1.57	28	58.43±.23	1.21	27	9.80±.06	0.33

Psaltriparus minimus sociabilis, new subspecies

Type.—Adult male, no. 94224 Mus. Vert. Zool., taken at Pinyon Wells, 4000 feet, Little San Bernardino Mountains, Riverside County, California, October 15, 1945, by Alden H. Miller; weight 5.9 gm.; orig. no. 5609.

Diagnosis.—Similar to *P. m. minimus* in that dorsal surface of head and neck darker than back, but pileum sooty and much less brown, near Deep Mouse Gray rather than Hair Brown; back less brownish gray, near Mouse Gray; under parts paler, especially laterally, as in *P. m. californicus*. Wing and tail length greater, in average intermediate between *P. m. minimus* and *P. m. providentialis*. Dorsal coloration darker, much more neutral gray, than in *P. m. californicus*.

Range.—Resident of piñon-juniper-scrub oak association of Little San Bernardino Mountains and adjoining mountains to northward, disconnectedly east to Eagle Mountain, all in Riverside and San Bernardino counties, California.

Specimens of *sociabilis* have been examined from the following localities: Quail Spring, 3600 feet, San Bernardino County (1); Barker Dam, 4000 feet, Riverside County (1); 6 mi. W, 3 mi, S Twenty-nine Palms, 3200 feet, San Bernardino County (2); Pinyon Wells, 4000-4300 feet, Riverside County (9); Eagle Mountain, 4200-4750 feet, Riverside County (15).

The coastal bush-tits and those of the Great Basin constitute two very differently colored groups of races. The coastal group has a dark pileum which contrasts with a lighter back whereas the interior group possesses a light pileum, lighter than the back or at most concolor with it. Where these groups adjoin, the hybridized populations show striking segregation into dark and light-capped types, with few if any individuals that display intermediacy. This situation prevails along the east flank of the Sierra Nevada in Inyo County and in eastern Lassen County, California.

With respect to this basic feature of pattern, *socialibis* falls with the coastal group. On Eagle Mountain, however, there is evidence of an interior element. Three of fifteen bush-tits taken there show a light ashy pileum comparable to that found in *P. m. providentialis*, although one is partly dusky and may be classed as intermediate. The other aspects of these birds, back color and size, do not differ significantly from those of other members of *sociabilis* with which they were associated in flocks. Due primarily to the ability of the character of dorsal pattern to show simple segregation, there is therefore rather clear evidence that there has been an intrusion of *providentialis* stock.

The populations of *sociabilis* in the western part of the range of the race, in so far as sampled, have shown no decisive *providentialis* traits. In back color they are the same as the Eagle Mountain sample and this is true also of tail length. Wing length, however, shows a graded increase, of the same order in both males and females, from *P. m. minimus*, through the Little San Bernardino sample and the Eagle Mountain sample, to the Providence Mountains population (see fig. 17). Thus the Eagle Mountain group in this respect also displays more evidence of *providentialis* blood than the typical *sociabilis* of the Little San Bernardino Mountains. Indeed fresh increments from this source may even today cross the 50 miles of intervening desert from the Providence Mountains. This seems more likely in this species than in the more strictly woodland-dwelling Plain Titmouse.

Could all the principal features of typical *sociabilis* have been derived from junction of *P. m. minimus* and *P. m. providentialis*? This cannot be answered finally without full

knowledge of the genetic mechanisms controlling the colors involved. The darkness of the dorsal coloration of *sociabilis* seems not to show influence of the light neutral gray of *providentialis* but the reduction of the brown element could be attributed to this parental influence. The pileum in fresh-plumaged birds from mixed flocks sampled in Lassen County is nevertheless brown, not dull sooty as in *sociabilis*. However, it does seem fully possible that out of an initially diverse parentage the *sociabilis* population might have retained and established its particular combination of features in which there are high gene frequencies for dark, contracting pileum (from *minimus*), for dark gray dorsum (from *minimus*), for grayish as against more brownish hue (some factors from *providentialis*), and for fairly pallid sides (some factors from *providentialis*); length of wing and tail seem to reflect a multiple factor situation with genes from both parental types persisting and yielding intermediate averages.

Some of the color characters might have been attained merely through modification of *P. m. minimus* by indirect (selective) environmental effect, as is thought to have been true in the titmouse and quail described in this paper. However, a better view in light of clear evidence of some dual ancestry is that a wide variety of genes was assembled by interbreeding of diverse stocks, from which state certain genes subsequently have gained predominance to produce a new combination of prevalent characters. The amplitude of variation, except in dorsal pattern on Eagle Mountain, is no greater than in other races of bush-tits. In short, we have here a normally uniform race, occupying a considerable area, not merely an intergrading zone, which has had a history of hybridization of strongly contrasting elements. Out of this hybrid background a new combination of features has been established with fairly uniform aspect.

The case is parallel in several ways to the hybrid origin of a race of junco in the Cassiar district of British Columbia, *Junco hyemalis cismontanus* (Miller, Univ. Calif. Publ. Zool., 44, 1941:341 ff.). Hybrid origin in itself has no bearing on the question of existence of a race. If a population or series of populations has all the attributes of a geographic race, namely reasonable constancy in one or more characters over an appreciable area, the method of origin is of no consequence taxonomically, although it is of the utmost theoretical interest. Such races represent new constellations of genes and may, quite as much as other geographic races, provide critical combinations of qualities that may have greatest survival value and may at some future time lead to a new species or be the one element of the present species that may survive an unfavorable environmental change.

Measurements in millimeters of males

	Wing			Tail			Bill length from nostril		
	No.	Mean	σ	No.	Mean	σ	No.	Mean	σ
P. m. minimus from southern California	28	46.65±.21	1.14	23	51.22±.45	2.14	28	4.74±.03	0.16
P. m. sociabilis	17	48.88±.22	0.90	15	54.87±.32	1.26	15	4.86±.05	0.19
P. m. providentialis	23	51.70±.20	0.95	19	56.47±.36	1.57	20	4.83±.05	0.23

Museum of Vertebrate Zoology, Berkeley, California, January 25, 1946.

TWO NEW RACES OF BIRDS FROM THE LOWER COLORADO RIVER VALLEY

By A. J. VAN ROSSEM

During the past year and a half Dr. Loye Miller and I have made field trips at frequent intervals to southern and western Arizona. The objectives have been to collect for comparative purposes adequate series of birds from that region in fresh, unabraded plumage, and to work out certain details of distribution as part of a program of intensive study of the biota of the Gulf of California.

Through our investigations a number of significant facts have become apparent, some decisively so whereas others will require further substantiation. The lower Colorado River valley has assumed even a more definite aspect as a sharply defined subfaunal area than formerly was realized; the Williams-Big Sandy-Santa Maria drainage basin, although geographically adjacent to the Colorado, is abruptly set off from it avifaunally. The relationships of the Pajaritos and Baboquívari mountains lie to the southward rather than with the Santa Ritas and other easterly ranges. The Harquahala Mountains in the western desert prove to be an Upper Sonoran "island" of considerable extent with at least two and possibly four endemic races. Finally, the currently accepted ranges of a number of races must be readjusted.

In past and present systematic studies of the birds of the northern portion of the Gulf area in Mexico I have been handicapped at times because of distributionally and seasonally unsatisfactory Arizona material, particularly with regard to species resident in desert regions. The plumage of desert birds often changes considerably within a short time after the annual molt and as early as the following March may be sand-cut and bleached to a truly surprising degree. Fresh, unabraded material now makes possible the definition of a number of races, the existence of which has been suspected for some time. Descriptions of these have been held in abeyance until observed differences could be verified by proper comparison. In the present paper two more Colorado River differentiates are added to the already impressive number which are essentially restricted to that sub-faunal area or district. Both serve to emphasize, too, the sharp division between the Colorado and the Williams drainage immediately to the eastward.

Toxostoma dorsale coloradense, new subspecies

Pallid Crissal Thrasher

Type.—Adult female, no. 10826 Dickey Coll., taken at Brawley, Imperial County, California, altitude minus 113 feet, December 25, 1910; collected by A. J. van Rossem.

Subspecific characters.—Paler than *Toxostoma dorsale dorsale* Henry. Upper parts grayish Drab instead of Deep Mouse Gray or Hair Brown; under tail coverts, Mikado Brown instead of Verona Brown; under parts paler and more buffy (less brownish) gray.

Range.—The lower Colorado River valley from northeastern Baja California and northwestern Sonora north, including the Imperial and Coachella valleys, to the lower Virgin River in southeastern Nevada.

There is no color plate in Ridgway which, to my eye, reasonably matches the underparts of the Crissal Thrasher. Perhaps Light Grayish Olive to Grayish Olive with a buffy tinge is an approximation of the pectoral region of *coloradense,* and Grayish Olive to Deep Grayish Olive with a brownish tinge is an equally good (or bad) approximation for *dorsale.*

Fresh-plumaged specimens of both races are grayer and darker, and conversely, worn specimens are browner and paler. However, the comparative racial characters remain evident until March or April, or until the plumage becomes too shredded (usually by April) to be of any comparative value. This species, like most thrashers, is prone to post-mortem "foxing," although not to the extent seen in *Toxostoma redivivum*.

While there is some individual variation in color in *dorsale*, I cannot be sure with the material at hand whether there are significant geographic trends. Possibly by coincidence the two darkest and brownest individuals examined are from New Mexico and the darkest and grayest are from the far-western localities of the Harquahala Mountains and the Williams River. These latter I have difficulty in separating from *trinitatis* Grinnell of the Trinidad Valley of Baja California. Grinnell, be it noted, separated *trinitatis* not by comparison with *dorsale* but specifically with the paler and more brownish race here named *coloradense*! Possibly *trinitatis* has a "split" range but I cannot develop any definite thesis without more abundant material from the Harquahalas and Trinidad Valley. It may further be noted that some other Williams and Harquahala species show this same curious darkness and grayness in close resemblance to northwestern Baja California races, from which they are completely cut off by the interposition of pale, buffy races of the lower Colorado River valley.

Specimens examined.—Toxostoma dorsale dorsale, 39 from New Mexico (Alamogordo; Carlsbad), Arizona (San Simón Valley; Huachuca Mountains; Santa Rita Mountains; Santa Catalina Mountains; Tucson; Fort Lowell; Continental; Baboquívari Mountains; Harquahala Mountains; Williams River; Salome) and Sonora (San José de Guaymas; Kino Bay).

T. d. coloradense, 23 from Nevada (St. Thomas; Clark County, opposite Fort Mojave), Arizona (Yuma), California (Palm Springs; Mecca; Thermal; Indian Wells; Potholes; Laguna Dam; Brawley; Bard; Neighbors), and Baja California (boundary at Mexicali). [Recorded from 25 miles south of Mon. 205 on the Colorado River, Sonora, but no specimens examined in the present connection].

Pipilo aberti dumeticolus, new subspecies

Western Abert Towhee

Type.—Male of the year in complete, new, fall plumage, no. J-1429 Dickey Coll., taken 3 miles northwest of Calexico, Imperial County, California, altitude minus 3 feet, October 13, 1921; collected by A. J. van Rossem.

Subspecific characters.—Entire plumage generally paler and redder than in *Pipilo aberti aberti* Baird of Arizona. Upper parts in fresh plumage Snuff Brown instead of Hair Brown; under parts Avellaneous with a distinct cinnamon tinge instead of Fawn Color; chin and throat with dark streaking narrower and usually with only the extreme point of the chin dusky. Size generally similar to *aberti* but tail shorter and bill less deep at base.

Range.—The Colorado River valley from northwestern Sonora and northeastern Baja California north, including the Imperial and Coachella valleys to the Virgin River valley in extreme southeastern Nevada and southwestern Utah.

The lighter, more russet and cinnamon tones which characterize the new race, as compared with the more grayish and pinkish tones of *aberti*, are most pronounced in fresh plumage but are apparent in most specimens even into March and April. Comparison of newly collected specimens with skins taken as long as thirty-seven years ago shows that the latter have "foxed" to a perceptible degree, although not to the extent that racial color characters are entirely obscured. For example, specimens of *aberti* taken in the fall and winter of 1908 at Fort Lowell remain distinctly "*aberti*" in color, even in comparison with recent *dumeticolus*.

The range of *aberti*, like that of *Toxostoma dorsale dorsale*, includes the Williams-Santa Maria-Big Sandy drainage, and specimens from that area show no intermediacy whatever toward *dumeticolus* of the Colorado.

Extreme and average measurements in millimeters

Males

	Wing	Tail	Culmen	Depth of bill at base
16 *aberti*	90.0-94.5[1] (92.1)	113.0-120.5 (116.0)	14.7-16.3 (15.2)	10.0-11.0 (10.3)
39 *dumeticolus*	89.0-95.0 (91.7)	106.0-116.0 (110.6)	14.7-16.6 (15.3)	9.1-10.5 (9.8)

Females

	Wing	Tail	Culmen	Depth of bill at base
13 *aberti*	84.0-91.0 (87.8)	106.0-113.0 (110.0)	13.7-16.0 (14.7)	9.7-10.6 (10.2)
24 *dumeticolus*	82.5-89.0 (86.1)	103.5-111.0 (106.8)	14.0-15.8 (14.8)	9.0-10.1 (9.7)

[1] One specimen 98.0, not included.

Specimens examined.—Pipilo aberti aberti, 29 from Arizona (Tucson; Fort Lowell; Wickenburg; upper Santa Maria River; Williams River).

P. a. dumeticolus, 70 from Utah (Washington; St. George), Nevada (opposite Fort Mojave; St. Thomas; Searchlight), California (Thermal; Mecca; Indio; Palm Springs; Indian Wells; Calexico; Fort Yuma; Potholes; Bard; Neighbors), Arizona (Yuma), Baja California (La Bomba), and Sonora (San Luis).

In addition to use of the collections at the University of California at Los Angeles, I gratefully acknowledge use of the collections at the Los Angeles Museum and the San Diego Natural History Museum, and the collection of Dr. L. B. Bishop.

Dickey Collections, University of California at Los Angeles, January 4, 1946.

NOTES ON THE WINTER BIRDS OF ATTU

By GEORGE MIKSCH SUTTON and ROWLAND S. WILSON

Attu is a remarkable island in many ways. Situated at the western end of the Aleutian Chain, it is nearly a thousand miles from the nearest point on the mainland of Alaska, it is far closer to Kamchatka than to any part of the North American continent, and it is directly south, not of Alaska nor any other American territory, but of Siberia. Furthermore, though generally thought to be far northern, it is well south of the Arctic Circle, at the southernmost limit of the Bering Sea. The ocean waters about it never freeze. It has what might, by persons who have never been there, be called an equable climate. Such ornithologists as William H. Dall, Lucien M. Turner, Austin H. Clark, A. C. Bent, Hamilton M. Laing, and Olaus J. Murie have visited it or written about its birds; but of these it is believed that only Turner actually visited the island in winter.

Our observations cover the period from February 20 to March 18, 1945, inclusive. During this time our work with the Armed Forces kept us in the southeastern part of the island, principally at Casco Cove, along the west side of Massacre Bay. We made three land trips to Alexai Point, the peninsula inclosing Massacre Bay at the east, one land trip from Casco Cove by way of a pass to the head of Temnac Bay, some five or six miles to the west, and one ocean trip eastward as far as Chirikof Point, the eastern tip of the island. But most of our bird observing was done about Casco Cove proper, from Gehre's Point (Casco Point on some maps) at the east around to Murder Point, the prominent headland enclosing Massacre Bay at the west. At no time were we able to visit the north side of the island or the rugged interior.

What impressed us most about Attu was the beauty of its mountains, the wildness of the weather, and the utter absence of trees. Within the period of our observations, the air temperature at sea level did not vary much from freezing as a rule. During the daylight hours it sank somewhat below 32°F. on 20 of the 27 days, climbed as high as 38° during the day on March 4, sank as low as 15° during the night on March 15, and averaged 31°. On March 18 the greatest temperature variation (15° to 31°), as well as the lowest temperature, was recorded. The general aspect was wintry: the sky overcast, the wind raw, the sea turbulent. Highlands and lowlands alike were covered with snow. Along the shore, tufts of rank grass and coarse stalks of wild parsnip protruded from the drifts, and boulders, turfy mounds and narrow gray beaches were always bare. Elsewhere, save for an occasional cliff or exposed slope, everything was white. When the sun came out in full force, as it did rarely, the surface of the snow melted a little even on the highest peaks, and the whole island took on a soft, almost satiny, sheen.

Where the snow was neither drifted nor subject to constant blowing, it was about knee-deep and difficult to walk through. On our trip to Temnac Bay we would have had a hard time without snowshoes, for nowhere was the crust firm, and some of the drifts were deep and treacherous. Especially troublesome were the streams, two of which flowed into the head of the Bay. The more easterly of these, Gorge Brook, was visible enough where the current was swift. We followed it almost to its mouth through a gorge. But the other, Temnac River, though larger, was so completely hidden by snow that we had to stay well to one side of anything which looked like a depression if we wished to avoid breaking through.

Several ponds northwest of Murder Point (see map) were frozen over, or at any rate covered with snow; but the ice was slushy and infirm and obviously not to be trusted, and one pond was open enough most of the time to attract a flock of golden-eyes.

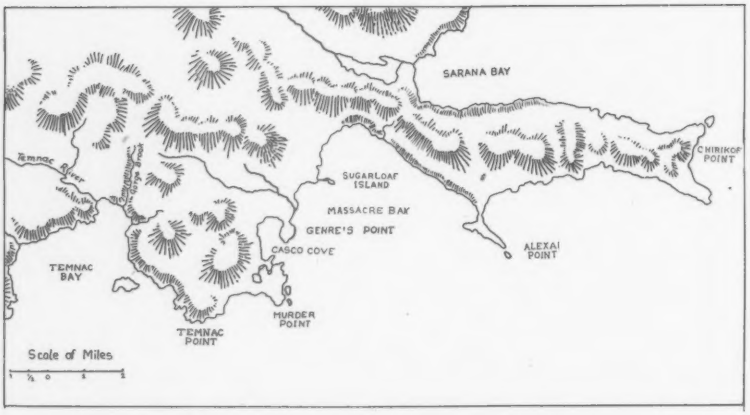

Fig. 18. Sketch map of southeastern part of Attu.

As for the wind, it blew most of the time. Indeed, we became so accustomed to it that when it subsided we were overly conscious of the calmness and silence. Its velocity was usually twenty to twenty-five miles per hour, with stronger gusts. It swept down across the mountains usually from the northwest, bringing with it soft snow fresh from the sky, mixed with harder flakes blown from the high slopes, or fine sleet which hissed on striking the ground. On certain days it kept aloft, blowing the dry snow like smoke from the peaks. Often we marvelled at the "smoking" of the big mountain just west of Casco Cove. The phenomenon was the more impressive when powerful eddies ascended the high gorges, sweeping masses of snow up into the very teeth of the gale.

The most notable quality of the Attu weather was its changefulness. During any one day we were almost certain to have wind, but there was no predicting what would accompany it. Squalls which were known locally as "williwaws" would pounce upon us with hardly a moment's warning. Watching from the Cove, we sometimes saw storm after storm moving slowly eastward, shutting whole sections of the island completely from sight. Between the dark, swirling clouds the sun might be shining, its rays sharply defining the limits of the storm areas and, falling full strength upon the mountains, giving them an almost supernal brilliance. Not infrequently the sunlight penetrated a snow-squall, and the swirling flakes, as seen against the yellow-gray, amorphous brightness overhead, were black as soot.

More than once we were astonished at our inability to distinguish the mountains from the sky on comparatively windless days. Because the distant cliffs were clear-cut and black, we knew there was no fog. So, putting our eyes to work on familiar slopes, we made out the faint shadows of gulches, pin-points of black which were exposed rocks a thousand feet farther up, finally the skyline itself. But how faint that horizon was, how curiously diaphanous the whole vast mountain mass! It was as if, in consequence of mirroring so perfectly the empty grayness of the sky, the earth itself had lost all substance and reality.

The sea and seashore were completely free of ice. Not once did we discover leather ice on pools among the rocks, or grounded ice-chunks on the tidal flats. The narrow gray pebble beaches were open everywhere to the waves, and the tides slipped in and

out over the seaweed-covered, dark brown rocks with never a sound of jostling or crunching. In Casco Cove the water temperature varied between 36° and 38°F., with an average of 37°.

The tidal flats teemed with animal life—sea urchins, chitons, snails, mussels, clams, limpets, and other creatures upon which birds might feed. We were not surprised, therefore, at the abundance of ravens and gulls. What the land birds lived on continued to be something of a mystery, however, for we found no extensive clumps of willow on which ptarmigan might feed, and the plants which should have furnished seeds for the finches and their allies all seemed to be buried under the snow. Nowhere away from the buildings did we come upon a trace of any species of rodent. The absence of lem-

Fig. 19. View northward from eastern tip of Alexai Point, Attu, March, 1945.

mings was the more surprising in view of the comparative abundance of the blue fox. These foxes, which we saw frequently, fed principally on garbage. Some of them were surprisingly tame.

The following list includes only such bird species as were actually seen alive by us or our acquaintances from February 20 to March 18, 1945. We are grateful to Olaus J. Murie for a critical reading of the manuscript and for many helpful suggestions; to J. Van Tyne for checking identification of an immature specimen of *Phalacrocorax p. pelagicus*; to Joseph J. Hickey for subspecific identification of the Snow Bunting specimen; to Dr. Alexander Bajkov for the photographic illustrations; and to A. L. Nelson, of the United States Fish and Wildlife Service, for identification of stomach contents. The specimens referred to are now at the Museum of Zoology of the University of Michigan.

LIST OF SPECIES

Phalacrocorax pelagicus pelagicus. Pelagic Cormorant. Cormorants were common in Casco Cove and Massacre Bay. At first we thought they were of two species—one with distinct white patches on the flanks, the other without; but when, on February 28, we captured a specimen of the latter sort, to find that there was an indistinct sprinkling of white all over the flanks, we decided that what we had been seeing were all Pelagic Cormorants, some in almost complete nuptial plumage, others in first winter or subadult dress. They were surprisingly regular in their habits. Time after time we observed what we believed to be recognizable groups of 3 to 5 birds flying in to a favorite feeding ground even in the roughest weather, fishing for an hour or so, then rising laboriously into the wind

and flying off, or climbing out onto a rock for a rest. On calm, bright days they sometimes congregated on rocks offshore to preen their plumage or spread their wings in the sun. On March 4, we counted between 50 and 60 birds in such a company on a low rock in Massacre Bay. Most of these were adults, with distinct white patches on their flanks.

The specimen collected on February 28 was an exceedingly fat subadult male. Its stomach and crop were packed with small sculpins which it had caught in water about 15 feet deep along the west side of Casco Cove. Its eyes were dull gray, faintly tinged with olive green. The eyelids, bill, and mouth corners were dull black, without the slightest hint of bright color. The mouth lining was dull gray, with a suggestion of flesh color. The testes were very slender and about 7 mm. long.

Philacte canagica. Emperor Goose. This beautiful goose we saw almost daily along certain stretches of shore, in flocks numbering from 4 to about 150. It was especially common along the east shore of Massacre Bay (near Alexai Point), and on the west side of Murder Point. At the latter place we saw several flocks, each of a hundred birds or more, on March 15.

A band of five, which we saw repeatedly, spent most of their time along the west shore of Casco Cove. Their feeding ground was a quarter-mile stretch of slippery, seaweed-covered rocks which were exposed at low tide. Here they walked slowly about, never straying far from each other, gathering eagerly what appeared to be some form of plant food. Their movements were unhurried and graceful. Occasionally, to save the effort of a long walk around, they hopped over cracks or from one ledge down to another. Often we saw them at rest in midmorning, sitting in a compact group not far from the water's edge, all headed into the wind. To our surprise we found them quite approachable. When we walked toward them they evinced concern by lifting their heads, cackling in a low voice, walking slowly forward, slipping into the water and swimming off; or at other times they responded by cronking loudly, moving forward at a half run, and rising in noisy flight. Their beating wings made a distinctly audible, crackling sound.

If we desired a really close look at Emperor Geese we had but to make our way quietly out to the very end of Gehre's Point or Murder Point at low tide. Here, stationing ourselves back of a big rock, or peering out through a "window" or narrow defile, we were able to watch the birds as they preened or fed. Even without a glass we could make out the delicate pink of the bill, the dark brown of the eyes, the bright orange-yellow of the feet.

The five Casco Cove birds which we saw so frequently might have been a family group, though we did not observe that two of them were larger, or more brilliantly colored, than the others. The larger flocks moved about together, exhibiting no tendency to break up into smaller groups when put to flight by the incoming tide.

Anas crecca. European Teal. On March 5 we saw an adult male teal close to the west shore of Casco Cove. Our attention was drawn to it by its shrill, almost whistled cry, which carried across the water with surprising power. When first seen, it was swimming at the water's edge, dabbling at the sand. In deeper water close by were two female Greater Scaups and a male Harlequin Duck; but the teal made no attempt to stay with these birds as we approached. It swam out from shore fifty yards or so, sprang lightly into the air, and flew northward a quarter of a mile. Carefully approaching the tidal pool in which it had settled, we had a good look with the glass. There was no white mark on the side of its chest. It was an Old World Green-wing.

Nyroca marila. Greater Scaup Duck. The Greater Scaup we recorded only along the west shore of Casco Cove, seeing a possible grand total of nine individuals. We noted it first on February 28, when a single male flew overhead as we were picking our way along the tidal flats. On March 4 we closely inspected a male and female which were idling in shallow water close to some rocks on which Emperor Geese, Harlequin Ducks, Eiders and Rock Sandpipers were resting. Both birds spread their wings while preening, giving us a look at the extensive white on the primaries. On March 5 we saw four individuals, two males, by themselves, and two females in company with a male Harlequin Duck and a male teal. On March 17 we saw two females near the head of Casco Cove, diving in water about ten feet deep.

Glaucionetta clangula. Common Golden-eye. A flock of about 15 male golden-eyes frequented the east side of Murder Point throughout our stay. They were reported to us shortly after our arrival, but we did not actually see them until February 26, on which date we observed them just south of the mouth of Casco Cove, feeding about a hundred yards from shore. Thereafter we saw them repeatedly, usually well out from shore in fairly deep water. Occasionally they flew inland to a fresh water pond at which our friend Everett L. Stone observed them several times.

We saw them to good advantage late in the afternoon on March 17. The sun was low but bright, and as they popped up from their diving, we noted the shining green of their heads and roundish white spots very clearly. All of them were males, of this we made certain; but five or six which were less glossy and less distinct in pattern than the others were, we decided, subadult individuals in changing

plumage. We saw a single female on March 4, off Sugarloaf Island, about two miles northeast of Gehre's point.

Clangula hyemalis. Old-squaw. The Old-squaw we noted daily. Even when we did not see it, we heard its far carrying and musical *ah, ah away! ah, ah away!* sounding far out in Massacre Bay or in the open sea east of Murder Point. Fair sized mixed flocks of males and females fed regularly in the middle of Casco Cove, occasionally making their way into shallower water or climbing out onto the low rocks with the Harlequin Ducks and Emperor Geese. Single birds which we encountered along the shore were, without exception, oil soaked or crippled. The Old-squaw was one of the very few species we saw in the open sea south of Chirikof Point, on March 7. It was uncommon in Temnac Bay, on March 12.

All Old-squaws which we had a chance to examine with the glass appeared to be in full winter, or breeding, dress (see Sutton, Auk, 49, 1932:42-51). Especially on sunny, quiet days we witnessed considerable courting, if not actual mating. From March 4 on we several times observed males and females which kept together as if paired.

We did not ascertain what these ducks were feeding on. They dived in water known to be 30 to 36 feet deep and presumably obtained food at the bottom. On February 28 we timed three males with a watch, finding the first to stay under 59 seconds, the second 58 seconds, the third a full minute. They opened their wings just as they dived, as if for flight under water.

Histrionicus histrionicus pacificus. Harlequin Duck. We saw the Harlequin daily, never in large flocks, but in little scattered groups of three to eight birds along the shore, especially on the outlying headlands where the surf pounded in among the rough rocks. It was distinctly the commonest duck of the region.

On several occasions we noticed flocks of three to six birds composed wholly of subadult males; but a hit and miss mixture of males and females appeared to be the rule, and we frequently came upon single birds of either sex standing quietly on a rock or feeding in water four or five feet deep a short way out from shore. So inconspicuous were the pied creatures as they scrambled from the rocks, slipped into the water, swam swiftly off and dived, that we were struck by the brightness of their plumage as they bobbed up, sleek and trim, from the dark waves. Now and then we saw a male and female together; but we witnessed neither courtship antics nor pursuit flights and "pairs" were the exception rather than the rule.

One specimen, a beautiful male which had died as a result of oil in the plumage, we preserved (March 9). Its stomach was empty and its testes were only slightly enlarged. On February 22, along the west side of Gehre's Point, we discovered the partly eaten, somewhat oily carcass of a female bird.

Somateria mollissima. Eider. From February 22 to March 5 we frequently saw what we believed to be the same three Eiders along the west shore of Casco Cove. Two of these were males in full breeding plumage, and one a female. Oddly enough they never seemed to be feeding. Whenever we saw them they were floating side by side in shallow water a few yards out from shore, or standing quietly on a rock. The bills of the males were bright greenish yellow. We recorded the species only once otherwise: a few birds (both males and females) some distance from shore at the head of Temnac Bay, March 12.

We agree with the A.O.U. Committee (Auk, 61, 1944:444) in considering the Pacific Eider conspecific with *mollissima* of Atlantic waters. So, while we did not collect a specimen, and are therefore not certain of the subspecies, we wittingly use the name *Somateria mollissima*.

Melanitta fusca. White-winged Scoter. This scoter we recorded only once: a male in high plumage, along the west shore of Casco Cove, March 17. We saw it very clearly, noting through the glass all its important field marks.

Oidemia nigra. Black Scoter. This scoter we recorded almost daily at the north end of Casco Cove, where rafts of 50 to 70 birds fed and rested usually about 300 yards out from shore. We clearly saw both males and females in these rafts, and males seemed to be the more numerous. On March 17, along the west side of the Cove, we saw two males which may have been suffering from the chilling effect of oil in their plumage. Presumably all these birds belonged to the American race, *Oidemia nigra americana*, but we took no specimen.

Haliaeetus albicilla. Gray Sea Eagle. The only eagles we saw during our stay were two dark-headed, white-tailed birds which drifted in wide circles from the head of Temnac Bay southeastward over Murder Point and out to sea at about 4 o'clock in the afternoon of March 15. They appeared to be on their way to Agattu Island. We were told that eagles nested somewhere in the mountains north of Temnac Bay, but no one ventured to describe the birds for us in detail. The Gray Sea Eagle may well be more than casual in the Aleutians, despite Turner's comment (Contributions to the Natural History of Alaska, 1886:159) to the contrary, especially if the two we saw were a mated pair (see also A.O.U. Check-list, 4th ed., 1931:71).

Falco peregrinus. Peregrine Falcon. We recorded this falcon, possibly the same individual, along the west side of Casco Cove on February 21, 22, and 27, and March 4. On March 9 we noted a single bird several times along the cliffs just back from the east shore of Massacre Bay. Observing it critically at close range in fair light, we decided that it probably belonged to the dark race, *pealei*.

Lagopus mutus. Rock Ptarmigan. It is noteworthy that we did not ourselves see ptarmigan or ptarmigan tracks during our stay despite the fact that we made a point of looking closely for them, especially on our trip to Temnac River on March 12. Two birds in full winter plumage, seen on a hill 2 miles west of the head of Massacre Bay on March 7, were reported to us, however; and droppings, which may have been several months old, were found on a snow-free ridge north of Casco Cove on March 4.

Erolia ptilocnemis couesi. Rock Sandpiper. This sandpiper we saw almost daily throughout our stay. It was especially common along the west shore of Casco Cove and at the outermost tip of Murder Point and Gehre's Point. As a rule we encountered it in flocks of 6 or 8 to about 50 individuals on rocks which were exposed at low tide. On February 22 and March 5 we saw unusually large flocks, numbering 100 or more, along the shores of Casco Cove and the east side of Murder Point. When motionless, it was very difficult to see. Often we descried one bird moving stealthily back of a rock as if to get out of sight, and with our next step forward put up a flock which had been in plain

Fig. 20. Tidal flats at Gehre's Point, Attu, March, 1945.

sight the whole time. The birds were very sure-footed. Their ability to alight upon steeply sloping, slippery rocks and to gather food at the very edge of the rough water amazed us. While standing or running, they rarely cried out; but as they sprang into the air they uttered a shrill *tserp* or *kreek* or *ke-rick*. In flying birds the rump and upper tail coverts were conspicuously dark.

We observed that small flocks frequently chose to run rapidly ahead of us rather than rise in flight. Occasionally, on having to run around a boulder, they would separate. Those which took the "high road" would scamper along the boulder's base as if loath to lose sight of the water; the others, caught by an incoming wavelet, either sprang into flight or swam forward with energetic strokes of their short legs and a bobbing motion of the head.

Several birds which we examined closely with the glass had spots of oil on their under plumage. One such bird was so weak that we captured it. A male in perfect winter plumage we collected on February 22. It was not fat. The testes were not enlarged. Its eyes were dark brown, its eyelids dull gray, its feet dull olive green, its bill yellowish olive at the base, blackish brown at the tip. The stomachs of these two specimens contained fragments (including operculi and digested body materials) of a heavy-shelled snail, probably *Littorina*.

Larus hyperboreus. Glaucous Gull. We saw large white gulls throughout our stay. Because they were indistinguishable in size from *Larus glaucescens* we at first thought these to be individuals of that species in some little-known plumage stage or phase, but the more we saw of them the more certain we became that they were immature *hyperboreus*. Their remiges were invariably white, and their general appearance, even at considerable distance, was much whiter than that of the palest subadult Glaucous-winged Gull. We had abundant opportunity to compare the two forms directly at Murder Point, where the voracious birds wheeled in close to shore as the garbage was dumped. Counting them as they moved upwind past us, we estimated that there was one Glaucous Gull for about every 25 Glaucous-winged Gulls on March 17. On that date we saw no adult Glaucous Gull in the flock. Indeed, the only adult Glaucous Gull we recorded during our stay we saw along the west shore of Casco Cove on February 22. The bills of immature *hyperboreus* seen at close range were very pale flesh color, occasionally with a dark band or ring near the tip. The feet appeared to be brownish flesh color.

Larus glaucescens. Glaucous-winged Gull. This gull was common along the shore wherever we went and on our two trips to sea we saw it at some distance from land (March 6, 4-5 miles south of Murder Point; March 7, 8-10 miles south of Chirikof Point). At Murder Point, where hundreds of gulls gathered to feed on garbage, it outnumbered all other species combined. Here the adults were easily recognizable, some appearing to be in full breeding plumage, others in slightly mottled, less clearly patterned, winter plumage. Far less easy to identify, and about three times as numerous, were the immature birds. These fell into three color-groups: (1) those which were brownish gray all over—like first year Herring Gulls but of a lighter, warmer brown; (2) those with brownish-gray body, wings and tail, light gray head, and indistinct white ring around the neck; and (3) those with brownish-gray body and wings, light gray head, white tail, and mixed pearl gray and brownish gray back and scapular plumage. We looked in vain for an individual with dark-tipped tail such as would surely have been encountered in any large flock of wintering *Larus argentatus* or *L. delawarensis*.

In adult birds the bill was yellow marked with an orange spot and fleck of blackish brown at the angle of the lower mandible; in subadult birds it was pale purplish flesh color, with a darkish tip; in birds assumed to be under a year old it was dark grayish flesh color. In adults the feet were pink, in immature birds pale flesh color or pinkish brown. As for the eyes, we noted that those of fully adult birds appeared to be pale grayish yellow, but those of immature birds varied so that we despaired of describing them adequately. In some individuals they were pale greenish gray, in others silvery hazel, in others dull yellowish brown, etc.

So much garbage was thrown out at Murder Point that the gulls could probably have subsisted wholly on it for months at a stretch; but we noticed that certain birds deliberately left the garbage, moved down the shore a way and fell to gathering clams. They followed the well known custom of dropping the mollusks onto the hard rocks, carrying them higher and higher until at last the tough shells were broken.

A male bird which we collected on March 7 had appeared, in flight, to be in full breeding plumage; but on close inspection we found the head and neck to be flecked with scattered gray feathers (most of which dropped out later, during the skinning process). Some of the rectrices were curiously malformed and twisted. The bird was exceedingly fat. Its testes were only slightly, if at all, enlarged.

Larus argentatus. Herring Gull. We recorded this species several times from February 20 to 27, the only birds we were sure of being those which we saw at close range in Casco Cove. Most of these were adults in winter plumage. Poor light conditions and stormy weather were partly responsible for this paucity of records; but our unfamiliarity with the field characters of immature *Larus glaucescens* was also to blame. In late February and early March we looked in vain for adult Herring Gulls at the Murder Point garbage dump; and after February 27 we saw only an occasional immature bird which we suspected of being this species.

Rissa tridactyla. Black-legged Kittiwake. On February 26, after a bad three-day storm, we saw a kittiwake in full winter plumage in the middle of Casco Cove. It flew about our anchored vessel with several Glaucous-winged Gulls, occasionally hovering not far from us as it prepared to drop to the surface of the sea for food. Its feet were black.

Uria lomvia arra. Northern Murre. This murre we saw almost daily from February 22 to March 12, principally in the deeper waters of Casco Cove, where it came regularly in small numbers (5 to 15 birds) to feed. We noted that it was fairly common (about 20 single birds; several flocks of 3-5) in the open sea south of Alexai Point and Chirikof Point on March 7. Birds seen close to the shore were invariably in weakened condition as a result of oil in the plumage. We almost caught one such bird along the west shore of Casco Cove on February 27; we heard of another which had crawled several yards through the snow and died (March 5); and on March 9 we found the oil-soaked remains of one several rods from the shore near Alexai Point. Most murres which we saw at all clearly were in

winter plumage, but the dark-headed individual which we almost captured alive on February 27 appeared to be in full breeding dress.

Synthliboramphus antiquus. Ancient Murrelet. This species we noted infrequently from February 25 to March 4, principally in the deeper waters of Casco Cove. We never saw more than two birds together and as a rule the birds appeared to go about singly. Most individuals which we had opportunity to examine with the glass were preening themselves vigorously, trying to get oil out of their plumage.

Nyctea scandiaca. Snowy Owl. Acquaintances informed us that several persons saw a "large white owl" perched on one of the turfy mounds along the shore of Gehre's Point on March 14.

Corvus corax. Holarctic Raven. The raven we saw daily even in the wildest weather. It was common along shore, where it fed on garbage with the gulls; but we saw it inland, too, flying about the cliffs and mountain tops. It was courting during our entire stay, and we frequently saw one bird feeding another solicitously, two birds prancing about together in the snow, or several birds cutting capers high in air. Their cries were varied, often comical, often surprisingly human.

On February 22 we watched one slowly beating its way upwind to a pole about a mile inland from the head of Massacre Bay. Here it perched, with head lowered and wings lifted slightly. As if in play, it spread its wings, allowed itself to be carried aloft a few feet, and dropped easily back to its perch. This performance it repeated ten or twelve times, keeping its bill parted the whole time. So far as we could see, it was not showing off before another bird. During bad storms, flocks of Ravens sometimes gathered in the shelter of a hill, or back of one of the turfy headlands along the shore, croaking and sputtering while the wind raged.

We noted that courting males had a habit of erecting the feathers of the sides of their heads into odd little ridges or horns which were distinctly visible from the front, less visible from the side. Several times we observed what we thought to be copulation in flight.

On February 28 at Murder Point, our friend Donald Stullken captured a full grown and apparently perfectly healthy Raven whose wing tips had frozen to the body plumage in such a way as to render it incapable of flight. At a distance we watched Stullken holding the bird; but an instant later we saw it peck savagely and break free, hobble off through the snow with Stullken in pursuit. Eventually it flapped its wings free of ice and rose in perfect flight!

Troglodytes troglodytes meligerus. Winter Wren. We saw our first wren on February 28, during a savage snowstorm. We had made our way to the point at the south end of Casco Cove and were scrambling about a hillock looking in vain for signs of lemmings and other small mammals. Noticing some bird tracks in the deep snow, we paused to examine them when out ran a tiny brown creature which at first we thought was a mouse. Without opening its wings, the wren scuttled under a tuft of grass, darted *through* the soft snow to the shelter of a rock, hopped into plain sight, jerked its body once, and disappeared. When next we saw it it was a rod away, scampering from rock to rock, keeping out of the wind as best it could. Judging from its tracks, it had been living about the hillock for some time, probably finding food in snowless areas under the matted wild rye.

On March 5, Stullken saw two wrens in the shelter of a bluff at Murder Point and heard one of them singing. On March 12, we learned that two wrens had been seen repeatedly about the Army Base hospital grounds, some distance back from the shore. One had been singing a good deal and everyone regarded the birds as a mated pair.

On March 15 we saw six or more wrens at Murder Point, but none of these seemed to be paired and we heard no singing despite the fact that the day was relatively calm and bright. One bird made its way between grassy hillocks, running from rock to rock along the shore. Another sprang from driftwood underfoot, flew 60 feet to the base of a towering boulder, alighted in a crevice among bright orange-red lichens (*Calloplaca elegans*), and fluttered by easy stages to the top.

We took one specimen, a male, on February 28. Though not at all fat, it was in good condition. The testes were not enlarged. Its eyes were dark brown, its bill and feet dark grayish brown, the lining of its mouth deep orange-yellow. In its stomach were "finely ground up fragments of amphipods resembling Talitridae."

Leucosticte tephrocotis griseonucha. Gray-crowned Rosy Finch. We saw this handsome species almost daily from March 1 to 17. It went about in flocks of 3 or 4 to 10 birds as a rule, although on March 17 we counted 21 feeding together near the garbage dump at Murder Point. Usually we saw it about snowless places on the bluffs and ridges, along one of the military roads, or drinking at an open spot along a brook. Its flight was graceful and sweeping, especially as it let itself be borne up and away by the wind at the brink of a cliff, or dropped, swoop by swoop, from some peak to the seashore. Its call note was a rather harsh *chew* or *tsew*. We took two specimens, a male and female, near the head of Casco Cove, March 5. In these the plumage was somewhat worn, the feet dark brown, the bills grayish olive at the base, dark brown at the tip, the eyes dark brown. Both were very fat.

The stomachs contained moss stem, fragments of seeds, blades and glumes of grass, and grit. In one of them there were 7 seeds of the crowberry (*Empetrum nigrum*).

Acanthis sp. Redpoll. Our friend Everett L. Stone perfectly described to us a single Redpoll which he saw feeding near a pond inland from Murder Point early on the morning of February 18. We could not be sure of the species, of course. McGregor (Condor, 8, 1906:120) found *Acanthis flammea* nesting on Unalaska Island. Turner (Contributions to the Natural History of Alaska, 1886:172) believed that the species did not occur anywhere in the Aleutians west of Unalaska. O. J. Murie (in letter dated June 14, 1945) calls the redpoll "a rare bird in the western Aleutians."

Melospiza melodia sanaka. Song Sparrow. An ornithologist fresh from the eastern United States will instantly recognize the Aleutian Song Sparrow's chirp of alarm, for this note has the same huskiness and alto quality as that of the brookside finch with which he is familiar. He will recognize also a higher pitched *chip*, which indicates greater excitement, and certain beady cries which accompany pursuit flights. As for the song, he will not at first be so certain it is a Song Sparrow's, but this will be partly because he hears it indistinctly in the high wind. Listening to it for the third or fourth time he will note the accented opening notes and will decide that it is a fairly average Song Sparrow song after all—much like those he has heard in New York, Pennsylvania, or South Dakota.

If the bird gives no call note, it is not so quickly recognizable. There are several reasons for this: (1) It seems to be in the wrong sort of environment. There are no bushes about, no brush piles, no weed patches. The only vegetation is coarse grass, most of which has been blown flat and buried under the snow, and the bare stalks of high weeds which offer little shelter. (2) Its shape is wrong. Because it is fluffed up, it looks far too short tailed for a Song Sparrow and its bill, even as seen at a distance, is too slender to be familiar. (3) The streaking of its under parts is not distinct. As seen in the usual gray weather, and against the snow, the bird appears to be plain grayish brown all over. (4) Its manner is not quite orthodox. It seems to move too slowly and it keeps under rocks too much of the time. This is not quite a valid comment, for the eastern ornithologist's concept of Song Sparrow behavior is based principally on the bird as seen in spring and summer.

We saw these interesting finches daily. Even during the wildest gales one or two of them stayed around the door of our barracks, looking for something to eat. Most of them lived along the shore, spending virtually all their time between the water's edge and the snow—a coastal strip varying in width from a few feet at high tide to a hundred yards or so at low tide. A few of them we invariably found about the turfy headlands, and the population was sometimes concentrated at these favorable points. As a rule we saw the birds in two's, and we believe that most of these were actually mated pairs. They were not in breeding condition, however (the gonads of specimens examined being unenlarged), and we saw little in the way of courtship, few pursuit flights of any sort, and no copulation. Singing we heard now and then on windy days, but it was especially noticeable in calm, sunny weather.

Certain facts about these sparrows merit special comment: (1) We frequently encountered them on the tidal flats feeding side by side with the Rock Sandpipers. Interested in what such individuals could be eating we collected a specimen, finding in its stomach several tiny snails. (2) We were struck by the fact that the bird's underplumage was unusually dense and that its skin was much tougher than that of Eastern Song Sparrows we had prepared as specimens. As for its odor, which was strikingly like that of the sandpipers, we guessed that littoral existence and food were responsible. (3) Certain pairs lived about scrap heaps of metal, piles of gasoline drums, and so forth, as Song Sparrows might be expected to live about brush piles. (4) The usual roosting place was a niche or crevice on the face of a big rock, or under a tussock on a turfy headland. As a rule our observing was done between 5 o'clock in the afternoon and dark, and we frequently saw the sparrows going to roost or flushed them from their roosting places. One which we saw asleep was fluffed up, with bill stuck between the back and scapular plumage, chest against the bare rock, and tail out, down and slightly spread. Others, which flew out as we climbed about the rocks in the twilight must have been sleeping under the rocks on the bare ground.

Plectrophenax nivalis townsendi. Snow Bunting. We saw the Snow Bunting infrequently: 5 birds inland a mile or so from the head of Casco Cove, February 20; 2 birds along the west side of Massacre Bay, and 6 along a snow buried stream at the head of Casco Cove, March 5; a single bird flying upwind through the storm, north of Casco Cove, March 8; several on the highest part of Gehre's Point, March 11; one on the beach, and 5 others flying back and forth between the beach and the highest part of Gehre's Point, March 14; a single bird at Murder Point, March 15; and 2 birds at Murder Point (garbage dump), March 17. All of these were males. They were quite wary. We did not hear any of them singing. The only specimen taken (Gehre's Point, March 14) was very fat. There was a good deal of brown in the plumage. The testes were slightly enlarged. The wing measures 118.5 mm.

United States Army Air Force's Tactical Center, Orlando, Florida, August 13, 1945.

FROM FIELD AND STUDY

Breeding Habits of Megapodes on Simbo, Central Solomon Islands.—Perhaps the most appropriate of the many vernacular names applied to the members of the genus *Megapodius* is that of "Incubator Bird." Instead of incubating the eggs in the usual manner, the female deposits them in a situation where the necessary heat may be derived from some natural source such as warm sand, decaying vegetation, or even warm volcanic ashes. The precocious young make their way to the surface and remain completely independent of adult care.

Throughout the Solomon Islands megapodes (*Megapodius freycinet eremita*) are common birds of the jungle. Their loud harsh calls are much more often heard than the birds themselves are observed. Individuals or small parties of 5 to 10 forage on the ground, scratching in the litter with their oversized feet, in the manner of barnyard fowl. Social contact seems to be maintained vocally by scattered members of a group, for often the calling which is initiated by one will be echoed by several others from widely separated positions. When suddenly startled, the birds may take to the wing and with frightened cackles fly laboriously a short distance before dropping into the concealing vegetation. More often they escape quietly on foot and only a fleeting glimpse may be obtained of them through the foliage.

On February 9, 1945, it was my privilege to visit the island of Simbo in the New Georgia Group, central Solomon Islands. Simbo is situated 50 miles west of New Georgia and is separated from the larger island of Ganongga by a strait about 4 miles wide. The relative geologic infancy of Simbo is attested by its small size, active vulcanism, and the fact that several groups of small birds, common on the other islands of the New Georgia Group, have not yet invaded it, for example, *Zosterops*, *Rhipidura rufifrons*, and *Myiagra ferrocyanea*. The volcanic activity on Simbo is restricted to a small hill in the southwest portion of the island. Several hot springs, mudpots, and steaming fissures at the base of the hill indicate the subterranean heat. The natives often cook over the boiling springs and in the crevices. Two large bare patches of rock are tinted with a yellowish crust from sulphurous deposits. The summit of the volcano is approximately 200 feet above the sea. From a distance it appears as a bare, whitish area. The core of the summit has been blown out by a recent eruption leaving a crater about 100 feet in diameter and 40 feet deep. Steam and gases issue from numerous fissures and the surface rocks in many places are too warm to permit a hand to rest comfortably upon them. The north-facing slope between the base and the summit is thickly vegetated and the soil is deep although rocky. There is no obvious surface evidence of vulcanism. It is in the warm soil of this slope that the megapodes of Simbo dig their burrows and lay their eggs. Most of the nest burrows were found on the lower third of the hill where the slope is the least abrupt.

As my party approached the area an adult megapode flushed from a burrow and flew off, cackling loudly. Several others were heard and two more were observed in the vicinity. The total area covered by the burrows was difficult to ascertain because so many were scattered through the jungle. As a conservative estimate I judged that in an area of approximately 5000 square yards there were at least 200 separate nest burrows. One especially concentrated area which I paced off measured 100 by 50 feet and contained 40 burrows. The natives told me that on the opposite side of the volcano there was a similar nesting area.

The dimensions of individual burrows varied considerably. The range in diameter was from 10 inches to 3 feet and in depth from 1 to 3 feet. Although most were simply a vertical hole with loose dirt in the bottom, a few had been undercut in such a manner that a short, covered tunnel was formed. Under the overhanging lip of one of these I found dry, crumbly earth. In this humid climate where rain falls in every 24-hour period the soil in such a position would never become dry and crumbled unless it were dehydrated by heat. The soil in the bottoms of the burrows was appreciably warmer to the touch than the exposed surface of the earth.

An old native volunteered to find some eggs for me. He tried several nest holes and at last from the loose soil in the bottom of one he unearthed an even dozen, large, elliptical eggs. They were about 3 inches long and half as great in diameter. The surface color of light brown was restricted to a flaky film which sloughed off, exposing the pure white shell beneath.

This unusual concentration of megapode nests seems directly correlated with the heat supplied by the volcano. The hill is a natural incubator. Except for the presence of the volcano, there are many hills on Simbo superficially like this one. I questioned the natives at great length and all were emphatic in their statements that nowhere else on the main island was there another nesting area of notable extent. On a small islet on the east side of Simbo they reported that a few megapodes nested in sun-warmed sand.

It was surprising to discover that even those natives who had had but little contact with whites knew the birds as "megapodes." The Simbo native name for the bird is "lápi."

The opportunity to visit Simbo was afforded by the kindness of the officers of the British Solomon Islands Protectorate at Hombu Hombu, New Georgia.—CHARLES G. SIBLEY, *Museum of Vertebrate Zoology, January 2, 1946.*

Snow Bunting on the Oregon Coast.—On November 10, 1945, at about 4 p.m., two Snow Buntings (*Plectrophenax nivalis nivalis*) were observed at Yaquina Head, Lincoln County, Oregon. The birds were flushed within 100 yards of one another from the gravel road leading to the lighthouse but were lost to view when they flew up the windswept, grassy ridge. An hour later at dusk one of the buntings was again encountered on the road where it had been seen previously. When approached, the bird flew about 30 feet ahead only to return and alight at the same spot from which it had risen. This individual, a male in good condition, was shot and preserved as a skin (no. 774) in the writer's collection.

This specimen appears to be the third skin obtained from western Oregon and the first from Lincoln County. In their account of the Snow Bunting, Gabrielson and Jewett (Birds of Oregon, 1940:599) list two skins collected on the coast at Netarts in Tillamook County 60 miles north of Yaquina Head on December 31, 1912, and October 27, 1934, and refer to an old winter sight record made about 1900 at Yaquina Bay. The species is regarded as an irregular winter visitor to eastern Oregon.—HAROLD E. BROADBOOKS, *Newport, Oregon, January 16, 1946.*

A Record of the Snow Bunting in California.—On the morning of November 25, 1945, while checking duck hunters along the south spit of Humboldt Bay, California, my attention was drawn by a single passerine bird which I at once recognized as foreign to the locality. To all appearances, it was identical with Snow Buntings I had seen in the eastern Aleutian Islands while on duty there with the Navy. Upon stopping the car, the bird flew off with a strong undulating flight and lit on the sand a short distance away. Fortunately, I was able to collect it after a short stalk. Subsequent identification by Dr. Alden H. Miller confirmed my belief that the bird is a Snow Bunting (*Plectrophenax nivalis nivalis*), the first certain record for the species in California.

Upon dissection, the bird proved to be a female, and it was quite fat. The crop was full of seeds of an unidentified species of legume.

It is interesting to note that the portion of the spit where the bird was taken is ecologically very similar to the tundra and near-tundra that Snow Buntings inhabit a good part of the year. In the main it is a low sand dune area, of but slight elevation above the sea, strewn irregularly with large drift logs and dotted here and there with small freshwater ponds. Around these pools and in some of the low depressions between dunes a low compact association of grass and sedge occurs, bare sand occupying the rest of the area. When first seen, the bird was resting on the grassy border of one of these little lakelets, where it was afforded some protection from the strong southerly wind blowing at the time.

Humboldt County has numerous such areas along its coast. Besides the south spit, the north spit of Humboldt Bay has such tracts, and they are not infrequent along the large stretches of sand dunes north of the mouth of Mad River. Then there are the Arcata bottoms, a flat agricultural area of several square miles extent, which in the winter, has short grass pasture land with numerous ponds. A sight record of the Snow Bunting was made here one winter by Fred Telonicher, of Humboldt State College.—WILLIAM H. SHOLES, JR., *Arcata, California, January 28, 1946.*

Notes on the Distribution of Spizella breweri taverneri.—Field studies conducted by the author in the Rocky Mountains of western Alberta and eastern British Columbia in the interests of the National Museum of Canada and of the National Parks branch have led to accumulation of certain data supplementary to existing information on the breeding range of the timberline race of the Brewer Sparrow, *Spizella breweri taverneri.*

In June and July, 1930, the author was collecting mammals in Jasper National Park, Alberta. At that time *taverneri* was known as a breeding bird only from the region adjacent to Atlin, in the northwestern corner of British Columbia. On July 18 of that year among the clumps of dwarfed spruce and balsam at timberline in the Tonquin Valley singing males, apparently on their territories, were heard and one was later collected. This specimen is in the National Museum of Canada.

On August 21 and 23 of the same summer while camped in the amphitheatre at timberline on Cascade Mountain, Banff, Alberta, a juvenile and an adult female were obtained. At the time these were believed to be migrant individuals.

Not until 1943 was the author again in the Rocky Mountains, this time engaged in big game studies for the National Parks Bureau. Extensive travels through virtually all parts of Jasper, Banff

and Waterton Lakes parks, Alberta, and into much of Kootenay and Yoho parks, British Columbia, from 1943 to 1945, permitted fairly extensive observation of the breeding range of *taverneri*.

This race is now known to be an abundant breeding bird in the timberline habitat on both slopes of the Rocky Mountains from the northernmost areas visited on the northern boundary of Jasper National Park south at least to the southern boundary of Banff National Park.

Specimens of breeding birds have been taken at Tonquin Valley, Cairn Pass, and Sunwapta Pass in Jasper Park, at Peyto Lake, Watchman Lake and Baker Lake in Banff Park, and on Thompson Pass, British Columbia. Timberline sparrows have been seen or heard virtually everywhere our travels took us to timberline in both these parks as well as in interprovincial boundary regions of Yoho and Kootenay parks.

On Sunwapta Pass on July 5, 1945, adults were feeding nestlings recently out of the nests, as they were also at Watchman Lake on July 28, 1945. On July 13, 1944, on the eastern slopes of Mount Southesk a nest containing three fresh eggs was found in a stunted balsam. The nest was placed two feet from the ground and was composed of fine weed stems and grasses with a lining of moose hair. The three eggs were in ground color the same clear blue seen in the eggs of the Clay-colored Sparrow (*Spizella pallida*). They were finely speckled around the larger end with pale lavender-brown and showed a prominent ring of pale brownish blotches just above the largest circumference.

In the course of field work in Waterton Lakes Park in extreme southeastern Alberta in July, 1945, two spizellas were heard singing, and one was seen at about 100 feet through 8-power glasses. It was not possible to identify them certainly, but they were not Chipping Sparrows or Clay-colored Sparrows, although of the same size. Their song differed from that of *taverneri* in being much shorter, with an average duration of about 2 seconds instead of 10 seconds, and of less complicated phraseology. Both birds were noted on the west slope of the high ridge between Summit Lake and Carthew Lakes. At this point they were within about 2 miles airline of the International Boundary Line and Glacier Park, Montana. Mrs. Bailey (Birds *in* Wild Animals of Glacier National Park, Washington, D.C., 1918) does not list any similar form of *Spizella* from the high altitudes of Glacier Park, but *taverneri* should be looked for there and any ornithologist visiting Waterton Lakes Park in the future should endeavor to establish the identity of the high-altitude *Spizella* population of that park.

A western extension in the south of the known breeding range of *S. b. taverneri* is provided by an adult female taken on August 27, 1945, at Paradise mine, 19 miles west of Invermere in the Selkirk Range, British Columbia. This individual was feeding a fully plumaged juvenile when collected. Other members of presumably the same brood were in the vicinity. The habitat was the same as that occupied by the species in its Rocky Mountains range. Extensive studies in the northern Selkirks adjacent to Mount Revelstoke failed to disclose the species in that region.

The extension of breeding range recorded in this note still leaves *Spizella b. taverneri* separated from *Spizella b. breweri* during the breeding period. At no point are the known breeding ranges contiguous.—I. McT. Cowan, *University of British Columbia, Vancouver, British Columbia, February 5, 1946.*

Scissor-tailed Flycatcher and Red-tailed Hawk Nest in the Same Tree.—It has sometimes been thought that the Scissor-tailed Flycatcher (*Muscivora forficata*), since it is so often seen in pursuit of large hawks, is a real enemy of the Red-tailed Hawk (*Buteo jamaicensis*), and this may well be the case. According to J. D. Bankston of Mason, Texas, many farmers in that section are pleased to have the scissor-tail nest near the house to keep the hawks away. On an experimental section in the Divide country west of Kerrville, Texas, however, we found a Scissor-tailed Flycatcher and a Red-tailed Hawk nesting in the same tree, a large live oak. The hawk's nest was on the west side, while the scissor-tail's nest was on the east side. The two seemed to ignore each other, and so got along nicely. The scissor-tail was incubating on May 17, 1945. On that date two young hawks were nearly ready to leave the red-tail's nest. It is of interest that these had been fed, at least in part, on young armadillos, which were fairly abundant that year and should have been easy prey for an alert Red-tailed Hawk.—Walter P. Taylor, *Texas Cooperative Wildlife Research Unit, College Station, Texas, September 22, 1945.*

Late Nesting of Caspian Tern in Utah.—Bent (U. S. Nat. Mus., Bull. 113, 1921:211) lists July 1 as the latest nesting record of the Caspian Tern (*Hydroprogne caspia*) on Lake Michigan, and May 25 as the latest in California. Writing of this bird as a nester in Oregon, Gabrielson and Jewett (Birds of Oregon, 1940:305) state: "Egg dates vary from May 12 to June 16 in the various colonies in different seasons."

In view of these records it may be interesting to note that on September 18, 1945, two broods of late-nesting Caspian Terns were seen on a bare artificial island on Unit 3 of Bear River Migratory Waterfowl Refuge, at the north end of Great Salt Lake, Utah. In the first brood, probably about

2½ weeks old, two young that had much loose down were flapping their wings as though about ready to practice flying; but their wings still contained pin-feathers, and the primaries were less than half grown. Another brood of three downy young were seen flapping their way into the water; these little balls of fluff had no pin-feathers whatever. The birds in this second brood were probably not more than 10 days old; they might have been hatched between September 6 and September 10.—CLARENCE COTTAM, *United States Fish and Wildlife Service, Chicago, Illinois, January 2, 1946.*

Red-naped Sapsucker in Santa Clara County, California.—On Sunday, November 18, 1945, while observing birds with the Santa Clara Valley Audubon Society at Alum Rock Park, near San Jose, California, it was our good fortune to locate a Red-naped Sapsucker (*Sphyrapicus varius nuchalis*). The bird was feeding in a live oak. Ten of the party watched it with binoculars at a distance of 25 feet as it opened holes in the bark. At such close range it was easy to distinguish the black markings on the head. The belly was yellowish-gray.—JAMES G. PETERSON, *San Jose, California, December 31, 1945.*

Swainson Hawks Working on Grasshoppers Again.—About 30 miles southeast of Sonora, Sutton County, Texas, on May 3 and 4, 1945, considerable numbers of Swainson Hawks (*Buteo swainsoni*) were observed feeding on the numerous grasshoppers on the overgrazed ranges. The hawks were usually observed flying low or perched on the ground. Twenty-five or more were observed at different times along a five-mile stretch of ranch road.

The grasshoppers, and likewise the hawks, seem to be more numerous on the overgrazed ranges infested with bitterweed. We saw none of the hawks and few grasshoppers on the better grassed pastures.

The observed relationship between the Swainson Hawk and the grasshopper outbreak was undoubtedly significant; also, although no actual grasshopper counts were made, it was obvious that a relation existed between the grasshopper plague and an extreme overgrazed condition of the range, as pointed out years ago by Treherne and Buckell (Grasshoppers of British Columbia, Dominion Canada Dept. Agr., Bull. 39, n.s., 1924).—WALTER P. TAYLOR, *Texas Cooperative Wildlife Research Unit, College Station, Texas, September 22, 1945.*

The Starling Arrives in Oregon.—On January 22, 1946, a Starling (*Sturnus vulgaris*) was obtained in the Grande Ronde Valley one and one-half miles west of Cove, Union County, Oregon, just at the edge of the western foothills of the Wallowa Mountains, at an elevation of approximately 3000 feet. The bird was taken by George L. Golay on his ranch when he shot into a flock of magpies congregated on pasture land. No other Starlings were noted by him at that time. Since the bird was strange to him, it was eviscerated and three days later was brought to me by his daughter, Bessie Golay. Although the bird was somewhat mutilated, it was possible to save it as a museum specimen.

Since the report by Wing (Condor, 45, 1943:159) of Starlings observed in southeastern Washington, it has been anticipated that the birds might soon be recorded in Oregon. The lapse of three winters until the first recorded arrival here in Oregon may be attributed partly to circumscribed field trips during gasoline rationing.

The Starling reported here appears to be the closest yet to the Pacific Coast, in point of longitude, except for the specimen collected by Howard Cantrell on January 10, 1942, near Tulelake, California (Jewett, Condor, 44, 1945:79). It, and the Pullman records of Wing (*loc. cit.*) may well presage an influx of Starlings which, once established, would have a clear sweep across the agricultural lands of the interior to the Cascade Mountains of Washington and Oregon. From here the Columbia River gateway offers Starlings the fertile Willamette Valley and the ultimate attainment of the shores of the Pacific.—CHARLES W. QUAINTANCE, *Eastern Oregon College of Education, La Grande, Oregon, January 27, 1946.*

Notes on Bird Mortality During Nocturnal Thunderstorms near College Station, Texas.—In the months of March, April, and May, 1941, several nocturnal thunderstorms occurred in the vicinity of College Station, Texas. Observations by personnel of the Department of Fish and Game and the Texas Cooperative Wildlife Research Unit on the campus of the Agricultural and Mechanical College of Texas after some of the more severe rains revealed an alarming number of dead birds, evidently victims of the storms. The number of birds obtained from such a small area indicates that the mortality over a considerable area must have been tremendous. In many instances the rains were accompanied by winds of very high velocity, which resulted in the birds striking objects such as trees, buildings, and power lines.

The first heavy rain of this sort occurred on the night of March 20. Next morning a Black-and-white Warbler (*Mniotilta varia*) was found on the campus. Following a violent thunderstorm on the night of April 3 a report was brought to the Fish and Game Department of several dead birds about one mile north of the campus. Investigation revealed sixteen dead geese on the ground near electric power lines. Fifteen were Snow Geese (*Chen hyperborea hyperborea*), the other a Blue Goose (*Chen caerulescens*). All these birds were apparently in one flock as they were close together on less than two acres of land.

On the night of April 29 another heavy rain fell. Dead birds recorded on this date included four Tennessee Warblers (*Vermivora peregrina*), one Kentucky Warbler (*Oporornis formosa*), three Indigo Buntings (*Passerina cyanea*), one Hermit Thrush (*Hylocichla guttata*), one Yellow-throat (*Geothlypis trichas trichas*), one Louisiana Water-thrush (*Seiurus motacilla*), two Chats (*Icteria virens*), and one English Sparrow (*Passer domesticus*).

The next night, April 30, thunder showers caused the death of one Indigo Bunting (*Passerina cyanea*), one Louisiana Water-thrush (*Seiurus motacilla*), and one English Sparrow (*Passer domesticus*).

Three nights later, May 3, another heavy rain fell. Birds found on the campus the following day included one Painted Bunting (*Passerina ciris*), two English Sparrows (*Passer domesticus*), one Sycamore Warbler (*Dendroica dominica*), one Nashville Warbler (*Vermivora ruficapilla*), one American Redstart (*Setophaga ruticilla*), and one Black-throated Green Warbler (*Dendroica virens*).

In addition to the above records made in 1941, a White Pelican (*Pelecanus erythrorhynchos*), was found below power lines on the campus following a thunderstorm on the night of October 20, 1939.

It is interesting to note that mortality was high when the weather was severe at night. Although the mean annual rainfall in this area averages close to 40 inches, normal rains, or even violent diurnal disturbances, have not produced alarming mortalities such as the ones just described. If violent nocturnal rains are consistently as deadly as these statistics indicate, it is indeed fortunate that they are of local occurrence and short duration.

The street lights of the campus might possibly be a factor in attracting night-flying birds; however, during such severe thunderstorms the visibility of the lights would be very low. Birds flying near a zone of thunderstorm activity may be attracted to the lights while seeking shelter from an approaching disturbance and be engulfed in violent winds and rain in so doing. This might account for the high concentrations of mortalities in a local area.

Eleven of the birds recorded are strictly migrants in this region, while three are summer visitants that were just arriving during the time these observations were made. Of the remainder, one is a winter visitant, one a vagrant, and one a resident. The White Pelican, a vagrant, frequently wanders over wide areas. The English Sparrow is the only strictly resident species affected. It will be further noticed that the birds killed were of species that migrate chiefly at night. This may be correlated with the fact that thunderstorms causing mortality at this season were nocturnal, although diurnal disturbances of equal violence occurred in the same period. Thus it would seem that violent night thunderstorms during the migrating season affect chiefly those birds in active migration and that resident species that will have sought adequate protection are less liable to harm.—RANDOLPH L. PETERSON and BRYAN P. GLASS, *Department of Fish and Game, Agricultural and Mechanical College of Texas, College Station, Texas, December 6, 1946.*

Shrikes in the Humboldt Bay Area, California.—From time to time people have reported shrikes in the Humboldt Bay area in California. However, actual specimen data seem to have been lacking; therefore the writer submits the following records.

An adult male Loggerhead Shrike (*Lanius ludovicianus gambeli*) was taken from a fence post amid the dunes just north of Samoa, California, by John Davis, on March 30, 1932. Another adult male, of the same race, was observed and collected by Mr. Davis and the writer a few miles south of Eureka, California, on November 7, 1939.

A first-year Boreal Shrike (*Lanius excubitor invictus*) was taken on October 9, 1939, near Arcata, California, by the writer, who also took an adult female a few miles south of Eureka on January 15, 1946. Both of the Boreal Shrikes were perched in the topmost branches of small shrubs.

There are three winter sight records by Mr. Davis and the writer, in which no identification as to species was made. These three winter dates all fall within the months in which actual specimens have been taken. All these birds have been taken or observed on open terrain within a few hundred yards of Humboldt Bay, California.—ROBERT R. TALMADGE, *Eureka, California, February 1, 1946.*

Unusual Visitors at the Ruby Lake National Wildlife Refuge, Nevada.—The Ruby Lake National Wildlife Refuge, Elko and White Pine counties, Nevada, was visited by two unusual

migrants, the Cackling Goose (*Branta canadensis minima*) and the White-fronted Goose (*Anser albifrons*) in November, 1943. The birds were first seen on November 11 when the writer counted 50 Cackling Geese and 14 White-fronted Geese on refuge areas; the latter species continued to increase until 214 were present on November 15, after which neither species was again seen.

So far as can be determined, the Cackling Goose has not been previously reported from the Ruby Lake marshes. According to information supplied the refuge manager by residents of Elko, Nevada, who hunted on nearby Franklin Lake in the early thirties, the White-fronted Goose was a fairly common fall migrant in those years.—HERBERT H. DILL, *United States Fish and Wildlife Service, Ruby Valley, Nevada, January 7, 1946.*

Pigeon Hawk Breeding in Utah.—Reference is made to Behle's "Check-list of the Birds of Utah" (Condor, 46, 1944:71) wherein the Western Pigeon Hawk is listed as a "rare transient and winter visitant." In Davie's "Nests and Eggs of North American Birds" (4th ed., 1889:188) the following appears under Pigeon Hawk (*Falco columbarius*): "Mr. Norris' cabinet contains two sets of four eggs each; one collected in the Wasatch Mountains, Utah, May 29, 1868. They have a cinnamon ground color, heavily spotted and blotched with burnt umber; sizes, 1.56 × 1.25; 1.59 × 1.25; 1.56 × 1.21; 1.59 × 1.23. Another set from Bingham county, Idaho, taken May 13, 1885." Norris in writing of his egg collection (The Oologist's Record, 6, 1926:57) refers to the first set under the name of *Falco columbarius bendirei*: "c/4, Wasatch Mountains, Utah, May 29, 1868. Very deeply marked with dark brown so much so as to hide the ground color of two of the eggs."

I have recently obtained this set of eggs from the collection of the late J. Parker Norris. It has been carefully examined and there is no question that the eggs have been properly identified as *Falco columbarius*. The original data record states: "Collected on the U.P.R.R. line in the Wasatch Mts., Utah, Camp No. 32, by L. E. Ricksecker, May 29, 1868. Quite fresh. Nest was an old one and had been placed on top of an old magpie nest, which was arched over. The upper nest, in which the hawk was breeding was probably built by some other bird during last season. It was 10 inches in diameter (inside) and was plastered with mud like a robins. Parent birds well seen and identified.—very noisy." In the course of my own field work in Utah from 1925 to 1930, Pigeon Hawks were observed several times in May and June in the upper ravines of City Creek Canyon, near Brighton in Salt Lake County and in the Wasatch Mountains in Summit County. While I was never able to establish a definite nesting record, there is no doubt that the Pigeon Hawk is a rare summer resident in that area.—COL. L. R. WOLFE, *Washington, D.C., December 28, 1945.*

The Second Specimen of the Oriental Hobby from the Solomon Islands.—The first specimen of the Oriental Hobby (*Falco severus*) taken in the Solomon Islands was obtained on Gizo in the New Georgia Group, central Solomon Islands (Mayr, Birds of the Southwest Pacific, 1945:218). More recently this specimen has been re-examined by Mayr (Amer. Mus. Novitates No. 1294, July 20, 1945) and again identified as the widely ranging subspecies *F. s. papuanus* Meyer and Wiglesworth. In this latter paper Mayr also records the sight observation of a small falcon at Soraken, northern Bougainville, which he believes "might have been a hobby." It is a pleasure to be able to substantiate this latter observation with a specimen. On October 18, 1944, while collecting in the jungle at Cape Torokina (Empress Augusta Bay) on Bougainville I took an adult male of the species. This bird was perched on the topmost bare branch of a tall, dead tree in the jungle about two miles inland. The testes were not enlarged, measuring 4 mm. in greatest diameter. The cere, feet, and circumocular skin were yellow. The wing measures 213 mm. and the tail 95 mm. These measurements accord with those Mayr gives in his definition of *papuanus*. This specimen is now no. 90027 in the Museum of Vertebrate Zoology.—CHARLES G. SIBLEY, *Museum of Vertebrate Zoology, March 1, 1946.*

NOTES AND NEWS

Plans for the Seventeenth Annual Meeting of the Cooper Ornithological Club are taking shape under the guidance of a local committee consisting of Sumner C. Brooks, Joe T. Marshall, Jr., Alden H. Miller, Robert T. Orr, Frank A. Pitelka and Charles G. Sibley. The meetings are scheduled for May 17, 18, and 19, in Berkeley. A call for papers soon will be mailed to club members.

Clinton G. Abbott, Director of the San Diego Museum, died on March 5, 1946. This is a serious loss to the Cooper Club as also to the naturalists of the San Diego area.

The Tucson Bird Club welcomes visitors to attend its meetings in the Tucson area. A field trip is scheduled for the first Sunday of each month, notice of which appears in the local paper on Saturday. An evening meeting is held on the third Thursday of each month in room 306 of the Agriculture Building.

Increased costs of printing of The Condor lead the editors to urge authors to avoid making changes in the wording of their papers while in proof stage. Necessary corrections arising from faulty type-setting or editing of course are in order. We dislike instituting a system of charges for author's corrections and ask for the cooperation of contributors so that we may avoid this.

PUBLICATIONS REVIEWED

"A Distributional Survey of the Birds of Sonora, Mexico," by A. J. van Rossem (Occas. Papers Mus. Zool., Louisiana State Univ. No. 21, October 25, 1945, 379 pp., 26 maps, 1 colored) marks a most important step forward in the ornithological study of Mexico. Sonora becomes the first state of that country, apart from the peninsula of Baja California, for which there is a comprehensive digest of taxonomic and distributional data. With an area roughly two-thirds that of California and an avifauna nearly as complex and large (532 species and subspecies), Sonora is still relatively little worked by ornithologists. Van Rossem recognizes this condition of affairs and makes no unwarranted claims of completeness for his work. Indeed he explains that some curtailment of an earlier program for exploration and report has resulted in less full treatment of taxonomy and life history than had been desired. These circumstances mean that there will long remain questions regarding the classification of Sonoran birds, and in fact one can at once recognize in van Rossem's report some decidedly dubious situations and controversial issues. Taxonomists have a way of differing on details of better known avifaunas anyway. But in recognizing these issues let there be no mistake about the great value of van Rossem's work and of its good quality, involving an accuracy of analysis of as high order as available data would seem to permit.

Five avifaunal areas are recognized in Sonora, only four of which are of significant extent and involve the mainland. These four are the Sonoran, Sinaloan, Apachian, and Durangan. There are no formulas on which delineators of faunal areas agree which fix the relative weight to be given to climatic zones, vegetation belts, differences in faunal composition, and numbers of local differentiates in defining faunal units. One worker stresses one factor more than another, and perhaps not to uniform degree in his own system, and consequently results correspond poorly. Herein lies much of the weakness of the nebulous "concept" of the faunal area which makes the units often arbitrary and of questionable scientific value. Sometimes we may even suspect them of being mere phantoms. Van Rossem is aware of this weakness and yet at this juncture cannot do anything to correct it. He is careful to call his units avifaunal areas, pointing out that they are based on bird distribution primarily. They indicate with some fidelity only the general spatial pattern of this group of organisms. They have a descriptive usefulness, although this would be enhanced by a more extended exposition of the data used in identifying and bounding them. Differentiation districts within several of the avifaunal areas are briefly mentioned.

Space will permit mention of only a few random examples of the taxonomic problems that arise. One may agree with the author's handling of the Canyon Wrens, in which great individual variability is recognized, and in the acceptance of a western race of the Myrtle Warbler. The contributions to knowledge of geographic variation in two species of orioles, *Icterus cucullatus* and *Icterus bullockii*, a new race of which is described from California, appear worthwhile. On the other hand, there is a strange insistence on the specific distinctness of *Limnodromus scolopaceus* and *Limnodromus griseus*, a separation for which there is poor evidence despite much that has been written on the subject. Also dubious is the maintenance of *Amazilia florenceae*, a unique hummingbird which Peters (Birds World, 5, 1945:72) probably correctly regards as a hybrid. Van Rossem on taxonomic matters tends to be a positivist. Consequently, in this work he has had to reverse himself on a number of stands

which were taken earlier. A saving virtue is the ability to change when new evidence demands.

In the accounts of species, localities and dates of significant record are cited following a general statement of range which includes zonal and seasonal aspects. Previously unpublished notebook and specimen records are appended. Additional localities are specified in conjunction with the synonymies. Taxonomic discussion is handled in footnotes.

Some highly useful elements of the report are the twenty-six distribution maps indicating occurrence by means of spots, the list of persons who have engaged in field work in Sonora (with unnecessary emphasis on numbers of type specimens collected), the gazeteer of localities, and the complete annotated bibliography for the ornithology of the state.—ALDEN H. MILLER.

At hand is a recent paper by Delacour and Mayr entitled "Notes on the Taxonomy of the Birds of the Philippines" (Zoologica, 30, 1945: 105-117). This is a worthy and useful contribution to taxonomy, but one aspect of it is unfortunate from the nomenclatural standpoint. Bibliographically this paper is a unit and, as such, the coauthors are responsible for the entire work. However, in the paper are several descriptions of new subspecies, to the names for which are attached the name of one or the other of the authors. It is probable that the authors desire that only one of their names be used henceforth in conjunction with each of these designations. They state that "the following discussions of the taxonomy of Philippine birds were . . . prepared independently by each author, as indicated by the initials in square brackets [and I suppose the same holds for the unbracketed names following new race designations], but each author is in full accord with the conclusions reached by his collaborator." Will this always be viewed as a clear indication "from the contents of the publication that some other person [than the joint authors] is responsible for said name" (Article 21, International Rules of Zoological Nomenclature). There have been previous instances of confusion on these matters, for example in connection with the names *Psaltriparus minimus grindae* and *Junco bairdi* which are listed currently by the A.O.U. Check-list with Ridgway as author whereas Belding was listed earlier. Ridgway (Proc. U. S. Nat. Mus., 6, 1883:155) seems to wish these names credited to Belding whose manuscript concerning them he presented. No matter how such questions are ruled upon and clarified in accordance with the codes of nomenclature that may be followed, there is nonetheless in these practices a source of confusion which should be avoided. If the coauthors are "in full accord," why not jointly assume responsibility for the names? If they are not willing to collaborate fully, separate papers should be written.—ALDEN H. MILLER.

MINUTES OF COOPER CLUB MEETINGS

SOUTHERN DIVISION

JANUARY.—The monthly meeting of the Southern Division of the Cooper Ornithological Club was held in Room 145, Allan Hancock Foundation, University of Southern California, on Tuesday, January 29, 1946, at 8:00 p.m., President Walter W. Bennett presiding, with about 35 members and guests present. The following names were proposed for membership: Mrs. Thomas H. Brown, 1853 S.W. 16th Ave., Portland 1, Ore., Keith Warren, Cameron, Ariz., both by W. Lee Chambers; William C. Starrett, 105 Glen Oak Court, Peoria, Ill., by Keith L. Dixon; James V. Duff, Pomona College, Claremont, Calif., by C. V. Duff; Allen H. Morgan, Cochituate Road, Wayland, Mass., by Ludlow Griscom; Gilmore A. Duncan, P. O. Box 66, Shandon, Calif., by Alden H. Miller; Joseph J. Hickey, Museum of Zoology, University of Michigan, Ann Arbor, Michigan., Harrison Flint Lewis, National Parks Bureau, Ottawa, Canada, Miss Clara Alma Moore, 3510 W. Michigan St., Indianapolis 8, Ind., Miss Peggy Porter Muirhead, Carleton College, Northfield, Minn., all by John McB. Robertson; Capt. Randolph L. Peterson, Box 254, Faculty Exchange, College Station, Texas, by Walter P. Taylor; and Joseph Brauner, Bristol Apartments, Apt. 202, 2109 Estrella Ave., Los Angeles 7, Calif., by A. J. van Rossem.

Report of the nominating committee, consisting of W. Lee Chambers, Chairman, Howard Robertson and A. J. van Rossem, was read by the Secretary. The name of Ed N. Harrison was suggested for President, C. V. Duff for Vice-president and that of Dorothy E. Groner for Secretary. Sidney Peyton moved that the nominations suggested by the committee be accepted, that the nominations be closed and the Secretary be instructed to cast a unanimous ballot for the persons named. It was so ordered.

C. V. Duff announced that the results so far in the endowment drive for the Joseph Grinnell Publication Fund have been most gratifying; however, the response has tended toward larger sums by a few rather than smaller sums by many. He added that a more widespread interest in this worthy effort is greatly desired, even though the individual contribution be small.

Sidney Peyton stated that in December, shortly after Christmas, he had seen a flock of 35 or 40 crossbills on Mount Pinos, and in the condor country on January 7, 1946, he had seen 17 condors sitting on a cliff, as well as a number in flight.

The speaker, Mrs. J. H. Comby, President of

the Los Angeles Audubon Society, discussed "Audubon Sanctuaries as a Factor in Conservation."

Adjourned.—DOROTHY E. GRONER, *Secretary.*

FEBRUARY.—The monthly meeting of the Southern Division of the Cooper Ornithological Club was held in Room 145, Allan Hancock Foundation, University of Southern California, Los Angeles, on Tuesday, February 26, 1946, at 8:00 p.m., Vice-president C. V. Duff presiding, with about 55 members and guests present. The following names were proposed for membership: Waldo Mayhew, 300 Julian St., Turlock, California, by Mrs. N. Edward Ayer; William Glase Reeder, 4725 Brynhurst Ave., Los Angeles 43, Calif., by Hildegarde Howard; Eliot F. Porter, 469 Maple St., Winnetka, Ill., Raymond Andrew Paynter, Jr., 208 Forest Hill Rd., Hamden 14, Conn., and Rosario Mazzeo, 120 Elm St., N. Cambridge 40, Mass., all by W. Lee Chambers; James H. Gilman, care of Jaw Dow, Wendel, Calif., J. Holman, 1691 W. 65th Ave., Vancouver, B.C., Canada, Walter L. Necker, 6843 Hobart Ave., Chicago 31, Ill., all by John McB. Robertson; and Eleanor Guyer Beemer by Ruth Gardner Schmidt.

Dr. Sherwin F. Wood gave an account of his experiences as a sanitation officer with the Marines in the Central Pacific together with a description of his bird observations on East Maui Island.

Adjourned.—DOROTHY E. GRONER, *Secretary.*

NORTHERN DIVISION

DECEMBER.—The monthly meeting of the Northern Division of the Cooper Ornithological Club was held at 8:00 p.m. in Room 2503 Life Sciences Building, University of California, Berkeley, on Thursday, December 20, with President W. I. Follett in the chair and about 35 members and guests present. W. A. Squires, 119 West Canada Ave., San Clemente, Calif., was proposed for membership by Hilda W. Grinnell, and George Campbell Monroe, 2064 Makiki St., Honolulu 4, T.H., was proposed by Alden H. Miller.

A letter from Laidlaw Williams was read telling of a request of a commercial motion picture firm to use Point Lobos State Park for filming purposes. It was moved, duly seconded, and passed unanimously that the Northern Division should officially protest the use of the State Park for this purpose. A letter was sent by the Recording Secretary to Mr. John H. Covington, Executive Secretary of the State Park Commission.

The President appointed a nominating committee, consisting of Lewis W. Taylor, Grace L. Crowe, and Junea W. Kelly, was appointed.

A letter from Ernest C. Mailliard announced the death of his father, Joseph Mailliard. A motion was passed that resolutions be prepared and sent to Mr. E. C. Mailliard expressing our sympathy. The committee appointed consisted of Alden H. Miller, C. B. Lastreto and Henry W. Carriger.

Mrs. Grinnell announced the publication of a book entitled "Chasing Wrens" which consists of essays written by the late Amelia S. Allen.

Field notes included a report by Paul Covel on the introduction by the local Fish and Game authorities on December 13, 1945, of 91 banded Valley Quail, two-thirds of which were males, on Yerba Buena Island. Five days later some had scattered as far as half a mile away but most were still near the point of release. Donald McLean reported that Starlings have appeared in force in northeast California. He counted about 200 in a flock of blackbirds in Honey Lake Valley recently. Mrs. J. W. Kelly reported 11 White-tailed Kites at Stockton on December 11 and one at Moss Landing on December 17. Arthur Myer saw a pair of Brown Towhees at Laurel Hill, San Francisco, on December 1. Commander Hicks reported a large concentration of geese (about 100,000 birds) at Nelson in the Sacramento Valley.

The speaker of the evening, Mr. Donald D. McLean, Game Biologist of the State Division of Fish and Game, discussed "Some California Birds of Prey," showing his Kodachrome films of eagles, condors, and hawks.

Adjourned.—ALICE S. MULFORD, *Recording Secretary.*

JANUARY.—The monthly meeting of the Northern Division of the Cooper Ornithological Club was held at 8:00 p.m. in Room 2503, Life Sciences Building, University of California, Berkeley, on January 24, 1946, with President Follett in the chair and about 60 members and guests present. Miss Mary Louise Perry, 2412 Durant Ave., Berkeley 4, Calif., was proposed for membership by Grace I. Crowe.

The nominating committee submitted the following proposals for officers for 1946: President, Sumner C. Brooks; Vice-president, Frank A. Pitelka; Corresponding Secretary, Hilda W. Grinnell; and Recording Secretary, Charles G. Sibley. It was moved that the nominations be closed and the persons named be declared elected. Motion carried.

Mrs. Courtright reported an Allen Hummingbird on January 20 at Larkspur, Marin County. Paul Covel reported 70 of the Yerba Buena quail still near the point of their release.

Dr. Robert C. Stebbins spoke on "Owl Calling as a Hobby."

Adjourned.—ALICE S. MULFORD, *Recording Secretary.*

For Sale, Exchange and Want Column.—Each Cooper Club member is entitled to one advertising notice in any issue of The Condor free. Notices of over ten lines will be charged for at the rate of 15 cents per line. For this department, address JOHN McB. ROBERTSON, Buena Park, California.

L'OISEAU *et* LA REVUE FRANÇAISE *d'* ORNITHOLOGIE was published throughout the war and four volumes (1941, 1942, 1943, 1944) are available, that of 1945 is in press. The five volumes can be ordered from Mr. Jean Delacour, New York Zoological Society, Bronx Park, New York 60, New York. The price for these volumes is $18.00 and can be remitted to Mr. Delacour.

FOR SALE—Auk, volumes 5, 13, 14, 15, 40-43, 45-47, 49-51, 53, and a great many odd numbers; most are in new condition.—W. LEE CHAMBERS, *Robinson Road, Topanga, California.*

FOR SALE—The Auk, volume 3, no. 3, to volume 59, inclusive; first eight volumes well bound; price $115.00.—J. M. EDSON, *336 West 50th St., Seattle 7, Washington.*

WANTED—A copy of G. S. Blaine's "Falconry," in good condition. Please quote price in first letter. —S. KENT CARNIE, *1249 Latham St., Mountain View, California.*

WANTED—To purchase books containing colored illustrations by the late Allan Brooks. Also colored prints used in calendars or any other types of advertising, by the same artist.—OLIVER N. WELLS, *Sardis, British Columbia, Canada.*

WANTED—A copy of "Italian Ornithology," by Itorre Arrigoni Degli Oddi. This book is in Italian and was published in Milan, by Urbico Hoepli, about 1927.—MILTON L. SEIBERT, *4649 Redding St., Oakland 2, California.*

WANTED—Western bird skins for museum, in exchange for A1 sets with nests, or for bird magazines.—ARTHUR W. BROCKWAY, *Hadlyme, Connecticut.*

FOR SALE—Will sell or trade for Auks: Beebe's "Pheasants, Their Lives and Homes," first signed edition, $35.00, "Jungle Days" and "Jungle Peace," 1st editions, $2.50 each; Osborn's "The Pacific World"; Ripley's "Trail of the Money Bird," $2.50; Hickey's "Guide to Bird Watching"; Sturgis' "Field Book of Birds of Panama Canal Zone"; Palmer's "Life of Joseph Wolf, Animal Painter"; Pearson's "The Bird Study Book," $1.00; Armstrong's "Handlist to Birds of Samoa," $1.00; Hudson's "British Birds," $5.00; Leach's "An Australian Bird Book," $2.00; Butler's "Foreign Finches in Captivity," $20.00; Barbour's "Cuban Ornithology," $4.00; Musgrove's "Waterfowl in Iowa"; Nordenskiold's "The History of Biology," $3.00; Mayr's "Systematics and the Origin of Species," $3.00; Coupin's "Les Animaux Excentriques," $3.00; May's "The Hawks of North America," $1.00; Brandt's "Alaska Bird Trails," $9.00; Wood's "The Art of Falconry," $9.00; Nat. Geog. Soc., "The Book of Birds," $1.00; Fuertes' "Artist and Naturalist in Ethiopia," $3.00; Whymper's "Egyptian Birds," $5.00; Nicoll's "Handlist of the Birds of Egypt," $3.00; Audubon's "The Birds of America," $4.00. Postage extra.—CARL STROMGREN, *Box 771, Iowa City, Iowa.*

FOR SALE—Olivier's "Monographie des Pies-Grieches du genre *Lanius*, 226 pages, 10 colored plates, photos, preface by Berlioz. Price $4.00.—J. DELACOUR, *American Museum Natural History, New York 24, New York.*

PRICE LIST OF PUBLICATIONS ISSUED BY THE COOPER ORNITHOLOGICAL CLUB
November 1, 1945

In issuing this new list we have made many changes but have endeavored to price the items as low as is consistent with our limited editions and in accordance with a recent inventory. Many of our publications are now nearly depleted and some entirely sold out. All these publications are sent post paid anywhere in the United States; for sales in California please add 2½% sales tax on all items except the Condor magazine.

THE CONDOR

Vol. I (1899) "Bulletin of the Cooper Ornithological Club" - - - - - - - - - - *(Out of print)*
Vols. II and III (1900-1901) The Condor - - - - - - - - - - - - - - - - *(Out of print)*
Vols. IV to VII (1902-1905) The Condor, complete, each volume - - - - - - - - - - - - - - - $10.00
Vols. VIII and IX (1906-1907) The Condor, complete, each volume - - - - - - - - - - $5.00
Vols. X and XI (1908-1909) The Condor, complete, each volume - - - - - - - - - - - - $3.00
Vol. XII (1910) The Condor, complete - - - - $5.00
Vol. XIII (1911) The Condor, complete - - - $7.00
Vols. XIV to XXIV (1912-1922) The Condor, complete, each volume - - - - - - - - - - - - $3.00
Vols. XXV to XXVII (1923-1925) The Condor, complete, each volume - - - - - - - - - - $7.00
Vols. XXVIII to XXXII (1926-1930) The Condor, complete, each volume - - - - - - - - - - $5.00
Vols. XXXIII to 47 (1931-1945) The Condor, complete, each volume - - - - - - - - - - $3.00

PACIFIC COAST AVIFAUNA

No. 1, 1900 Birds of the Kotzebue Sound Region, Alaska; 80 pp., 1 map - - - - - - - - - - - - $1.00
By J. GRINNELL

No. 2, 1901 Land Birds of Santa Cruz County, California; 22 pp. - - - - - - - - - *(Out of print)*
By R. C. MCGREGOR

No. 3, 1902 Check-list of California Birds; 100 pp., 2 maps - - - - - - - - - - - - *(Out of print)*
By J. GRINNELL

No. 4, 1904 Birds of the Huachuca Mountains, Arizona; 75 pp. - - - - - - - - - - - *(Out of print)*
By H. S. SWARTH

No. 5, 1909 A Bibliography of California Ornithology; 166 pp. - - - - - - - - - - - - - - $4.00
By J. GRINNELL

No. 6, 1909 Index to the Bulletin of the Cooper Ornithological Club, vol. I (1899), and its continuation, The Condor, vols. II to X (1900-1908); 48 pp. $4.00
By HENRY B. KAEDING

No. 7, 1912 Birds of the Pacific Slope of Southern California; 122 pp. - - - - - - - - - - - - $ .50
By G. WILLETT

No. 8, 1912 A Systematic List of the Birds of California; 23 pp. - - - - - - - - - - - - - - - $ .25
By J. GRINNELL

No. 9, 1913 The Birds of the Fresno District; 114 pp. - - - - - - - - - - - - - - - - $ .50
By J. G. TYLER

No. 10, 1914 Distributional List of the Birds of Arizona; 133 pp., 1 map - - - - - - - - - - - - $1.00
By H. S. SWARTH

(With all orders for Avifauna 10, we include the supplement.)

Supplement to Pacific Coast Avifauna No. 10. The author, Anders H. Anderson, has brought this state list up to date. Reprint from The Condor, 36, March, 1934, pp. 78-83 - - - - - - - - - - - - - - - $ .30

No. 11, 1915 A Distributional List of the Birds of California; 217 pp., 3 maps - - - - - - - - $1.00
By J. GRINNELL

No. 12, 1916 Birds of the Southern California Coastal Islands; 127 pp., 1 map - - - - - - - - $ .50
By A. B. HOWELL

No. 13, 1919 Second Ten Year Index to The Condor, volumes XI-XX (1909-1918); 92 pp. - - - $2.00
By J. R. PEMBERTON

No. 14, 1921 The Birds of Montana; 194 pp., 35 illustrations - - - - - - - - - - - - - - - $2.00
By ARETAS A. SAUNDERS

No. 15, 1923 Birds Recorded from the Santa Rita Mountains in Southern Arizona; 60 pp., 4 illustrations. $ .50
By FLORENCE MERRIAM BAILEY

No. 16, 1924 Bibliography of California Ornithology; 2nd Installment; 191 pp. - - - - - - - - - $2.00
By J. GRINNELL

No. 17, 1925 A Distributional List of the Birds of British Columbia; 158 pp., colored frontispiece and map, 26 line maps, 12 ills. - - - - - - - - - - - $1.50
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